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LONDON, SATURDAY, SEPTEMBER 23, 1849.

REVIEWS

Holbein's Dance of Death: with an Historical and Literary Introduction. Smith.*The Basle Dances of Death—[Die Baseler Todtentänze in getreuen Abbildungen].* By H. F. Massmann. Stuttgart; London, Williams & Norgate.*Hans Holbein's Initial Letters, with the Dance of Death after Hans Lützelburger's original Woodcuts.* Truly copied by Heinrich Loedel; with accompanying Verses and an Historical Essay upon the Dances of Death—[Initial-Buchstaben mit dem Todtentanz, &c.] By Dr. Adolf Elissen. Göttingen; London, Williams & Norgate.*A Dance of Death for the Year 1848—[Auch ein Todtentanz aus dem Jahr 1848, &c.]* Designed and drawn by Alfred Rethel, &c. Leipzig; London, Williams & Norgate.

To speak after the quaint manner of old Fuller, "The 'Dance of Death' is, as it were, a homily in black letter;" and as the 'Biblia Pauperum' supplied in by-gone days the place of the Scriptures to those who could not read, so did this writing on the wall serve as a sermon—grotesque indeed, but startling and intelligible—to inculcate upon all who saw it the solemn text "Dust thou art, and unto dust shalt thou return."

There is no subject in the wide range of popular literature involved in greater obscurity than the whole history of this strange Morality,—whether we take its origin, its date, its title of 'La Danse Maratre,' or *Macabre*, as it is more generally written,—or the question, who was the artist to whose pencil we are indebted for that unrivalled series of woodcut illustrations known as the Holbein 'Dance of Death,' a series which has been reproduced in lithography by Prof. Schlotthauer, in the first of the works which we have just enumerated, with a spirit and fidelity quite extraordinary.

An old German commentator upon this subject, J. G. Meintel, remarks that there is something contradictory in the very name of the Dance of Death,—for that in death people do not dance, and when dancing they do not think of death: and he adds, that albeit it is an old fancy to represent Death with persons of all ranks dancing after him, yet that such a combination of death and dancing is not so old as either death or dancing itself, these being two of the oldest things in the world. That Death is the twin brother of Sin, and was born before any other of Adam's offspring; while, according to the legends of the Jews, dancing is still older, inasmuch as it is there recorded that at the marriage of Adam and Eve in Paradise the angels danced for joy, with the sun, moon and stars for partners.—Leaving these speculations of Master Meintel for the more sober truths of history, one fact is certain. The Dance of Death has not come down to us as a tradition of ancient Art. In the Middle Ages—partly, perhaps, in some of the religious pageants of the Church, partly in the results of some of those wide-spread epidemics which desolated Europe, and partly perhaps in an amplification of the harrowing legend, 'Le dit des trois Morts et des trois Vifs,'—is its origin to be sought.

According to the above-named story,—which was extremely popular in the thirteenth and fourteenth centuries,—three noble youths hunting in a forest encounter three hideous spectres or images of death, from whom they receive a mournful lesson on the instability of worldly riches or pleasures and the hollowness of earthly grandeur. In the Arundel Manuscript No. 83

is a brief version of this popular legend, with a curious illumination showing the figure of three kings (one of whom carries a falcon) and three skeletons, with the accompanying lines:—

Over the Kings.

Ich am aert,
Lo whet I se
Me thinketh hit beth devels thre.

Over the Skeletons.

Ich wes wal fair,
Such scheltou be;
For Godes love, be wer by me.This legend—which was sometimes treated as a vision of St. Macaire (in which name Mr. Douce saw the origin of the term *Macabre* as applied to the Dance of Death)—was very popular in this country; and was delineated, with other scriptural subjects, on the walls of our churches. A remarkable instance, discovered in 1846 in Battle Church, Sussex—where it was painted in outline with red ochre and flat tints of yellow and red—probably a work of the close of the fourteenth century—is described by Mr. Waller in the 'Journal' of the British Archaeological Association.

The author of the 'Historical and Literary Introduction to Holbein's Dance of Death' thus describes the first attempts at a serial representation of that subject.—

"The earliest notice of a picture representing a series of figures in a sort of dancing procession and bearing the name of the 'Dance Macabre' occurs in an account of one painted round the walls of the Cemetery of the Innocents of Paris, in the early part of the fifteenth century, but which has occasioned some misapprehension. It is thus narrated by M. Fortoul.—At the commencement of the year 1408, the Duc de Berry, who for nearly thirty years had enriched himself by pillaging the provinces confided to his care by the unhappy Charles VI., thought, as he was getting old, of preparing a sepulchre worthy a person of his wealth. Consequently, he embellished the Church of the Innocents, where he wished his body to be placed. He caused to be represented in relief on the south gate, the Legend of St. Macaire, that half a century before had been painted by Andrea Orcagna and others, but which France now claimed as its own invention. On one side of the gate three dead persons were represented standing in a forest; on the other three living princes were going to the chase. Under the figures were, engraved on the stone, verses in French, containing the words which they appear to interchange. Six years afterwards the Duc de Berry, having altered his determination as regarded his place of interment, erected at Bourges a rich chapel where he was buried; but the sculpture which he had caused to be executed at the Cemetery of the Innocents, being continually before the eyes of the people, must have produced a strong impression on their imagination. In the 'Journal of the Reigns of Charles VI. and VII.,' we read, 'Item l'an 1424 fut faite la Danse Maratre (pour *Macabre*) aux Innocents, et fut commencée environ le mois d'Aoust et achevée au Karesme suivant.' These words have given rise to very different interpretations. Villaret in his 'History of France,' M. de Barante in the 'History of the Dukes of Burgundy,' M. Ville-neuve de Bergemont, in his 'History of René d'Anjou,' take upon themselves to relate, from the interpretation they have placed on this laconic testimony, that in the year 1424, the Duke of Bedford and the Duc Philippe le Bon, meeting in Paris got up an extraordinary spectacle, in which Death was made to appear dressed in royal robes, and followed by many persons representing various grades of human life. They proceeded to the Cemetery of the Innocents, and from thence into the streets of the city. M. Peignot remarks, not without reason, that a like procession could not last from the month of August to the following Lent; besides, we find in the same journal, in the year 1429, that 'Le Cordelier Richard, prêchant aux Innocents, estoit monté sur un hault échaffaut qui estoit près de toise et demi de hault, le dos tourné vers les charniers, en contre la charronnerie, à l'endroit de la Danse Macabre.' He concludes from this that this 'Dance' had not been represented by living persons, but only painted on the

walls of the cemetery:—an opinion in which Douce coincides."

On this we would remark—after directing the attention of the reader to the confirmation found in the foregoing statement of our suggestion as to the legend of St. Macaire preceding and leading to the 'Danse Macabre'—that in this as in many other questions of a similar nature the advocates of both opinions are in the right. The pageant was probably performed; as we know it was at Besançon in 1453—where, as it appears from the archives in the Cathedral, the Friars Minor gave a reward of four measures of wine to those who on the 10th of July in that year performed this dance; for that by *Choream Machabeorum* the Danse Macabre is intended there can exist no doubt:—"Senescallus solvat D. Joanni Coleti matriulario S. Joannis quatuor simasias vini per dictum matriclarium exhibitis illis qui *Choream Machabeorum* fecerunt 10 Julii nuper lapsa hora missæ in ecclesia S. Joannis Evangelistæ propter capitulum provinciale Fratrum Minorum;" and the painting at the Innocents would be at once a record of such performance and a lasting memorial of the omnipotence of the grim King of Terrors.

M. Fortoul is, however, incorrect in his statement that all paintings of the Dance of Death to which a certain date can be assigned are posterior to the representation in the city of Paris:—and he is as little justified in the conclusion which he draws thence, that the legend and the dance are both peculiarly French in their origin. For even if the painting at Minden in Westphalia with the date of 1383, mentioned by Fabricius, be disregarded—and there are reasons for believing that that work scarcely answers to the idea of a Dance of Death—there can be no doubt that the Dance in the Klingenthal at Little Basle discovered by the worthy Master-Baker Emanuel Büchel in 1766, carefully copied by him in the following year, and of which a description and engravings will be found in the learned work of Dr. Massmann, belongs to as early a period as 1312. And there is good reason for supposing that—as we have seen proved by the painting in Battle Church that the Legend of St. Macaire was popular in this country in the fourteenth century,—so also was the Dance of Death.—The following allusion in the Vision of Piers Ploughman seems to point very distinctly to the subject,—

Deeth cam dryvynge after
And al to duste passed
Knyges and knyghtes
Kaysers and popes
Lercd and lewd,
He leet no manne stande
That he litte evenc,
That ever stirred after.
Manye a lovely ladye
And Lemmans of knyghtes
Swowned and swelled
For sorowe of hise dyntes:—and the editor of the Holbein 'Dance' remarks that Mr. Thoms in some observations upon the Danse Macabre published in the *Archæological Journal* has commented upon a passage in Chaucer's 'Knight's Tale' descriptive ofThe Portreyture that was upon the wall,
Within the temple of mighty Mars the rede,

for the purpose of showing that in describing the paintings which decorated the Temple of Mars, Chaucer drew not merely from Statius or Boccaccio, but also from his memory of some Dance of Death which he well knew would be recognized by his readers. This passage from Chaucer deserves to be quoted at length.—

Ther saugh I furst the derk ymagynynge
Of felony, and all the compassynge;
The cruel ire, as reed as any gleede;
The Pikepurs, and eek the pale drede;
The myler with the knyf under his cloke;
The schipne brennyng with the blake smoke;
The tresoun of the murtheryng in the bed;
The open werres, with woundes al bi-bled;

Contek with bloody knyfe, and scharp manace.
 Al ful of chyrkyng was that sory place.
 The sleer of himself yet saugh I there,
 His herte-blood bathy bathed at his here;
 The mayl y-drove in the schede a nyght;
 The colde deeth, with mouth gapyng upright—
 Amyddes of the tempel set mischaunce,
 With sory comfort and evel contyngance.
 I saugh woodnes laughyng in his rage;
 The hunt strangled with wild bores corage;
 The caroughe in the bushe, with throte y-corve;
 A thousand slaine, and not of quene y-torve;
 The traunte, with the prey by force y-raft;
 The town destroyed, there was no thyng left.
 Yet sawgh I brente the schippes hoppesteres;
 The hunte strangled with the wilde beres;
 The sowe freten the child right in the cradel
 The cooke l-skalded for al his longe ladel,
 Nought both forgotten the infortune of Mart;
 The carter over ryden with his cart,
 Under the wheel ful lowe he lay adoun.

It is somewhat remarkable that neither Mr. Thoms nor the Editor of the Holbein 'Dance,' when referring to this passage, should have noticed that, if this quotation proves—as we are inclined to believe, with them, it does—the existence of a 'Dance of Death' in England in Chaucer's time,—inasmuch as Chaucer died in 1400, it further proves that such 'Dance' must have been a yet earlier one than the much-talked-of 'Dance' at the Innocents, at Paris. It would go far perhaps to justify the latter part of M. Michelet's assertion—"Cette 'Danse' plaisait fort aux Anglais, qui l'introduisirent chez nous."

But whatever may have been the origin of the Dance of Death, its wide-spread popularity admits of no doubt. It was painted in the cloister of the Church of the Sainte Chapelle at Dijon, by an artist named Masoncelli, in 1436,—and in the Todten Kapelle, in the Saint Mary's Church in Lubeck, about 1463. A similar work was painted at the Palace of Duke George, of Dresden, about the year 1535; and consisted of a series of twenty-seven figures, of which the twelfth represented the Duke himself. In Lucerne, there were no less than three 'Dances of Death':—one of which was a copy of that of Basle. Mention is made of other paintings of this class as existing at Constance, Fussen, Kukuksbad, Straubing, Erfurt, S. Ildefonso, Leipsic, Annaberg, Nuremberg, Strasburg, Vienna, Berlin, Naples, Amiens, Rouen, Fecamp, Blois, and Vienne; and, among other places in this country—as we know on the trustworthy authority of Stow—"about the great cloister on the north side of St. Paul's, environing a plot of ground of old time called Pardon Churchyard, was artificially and richly painted the 'Dance of Machabray,' or 'Dance of Death,' commonly called the 'Dance of Paul's'; the like wherof was painted about St. Innocent's cloyster at Paris. The meters or poesie of this 'Dance' was translated out of French into English by John Lidgate, monke of Bury, the picture of Death leading all Estates, at the dispenche of Jenken Carpenter, in the reigne of Henry the Sixt."—He elsewhere tells us, that "on the 10th April, 1549, the Cloister of St. Paul's Church, called Pardon Churchyard, with the 'Dance of Death,' commonly called the 'Dance of Paul's,' about the same cloister, costly and cunningly wrought, and the chappel in the midst of the same churchyard, were all begun to be pulled down." This 'Dance of Paul's' is frequently alluded to in contemporary writers: amongst others by Sir Thomas More,—and in the old English version of the 'Demaundes Joyeuses'; where, in answer to the "Demaunde, wherefore be there not as many women conteyned in the 'Dance of Poules' as there be men?" we are told, "Because a woman is so ferefull of herte that she had lever daunce amonge quyecke folke than dead."

But of all these varied representations that of Basle is the most celebrated: and probably no work upon this or any similar subject has been

so frequently mentioned—and so uniformly incorrectly. It has been generally, but most erroneously, referred to Holbein. Its real history, however, and that of its predecessor at Little Basle, are as fully and satisfactorily detailed by Professor Massmann as the nature of the subject and its antiquity will admit. He shows how "*der liebe Tod von Basle*," as the picture was affectionately designated by the inhabitants of that city, originated in a desire of the prelates attending the Grand Council at Basle to commemorate the grievous pestilence which visited it during the sitting of the Council, and numbered among its victims some of the cardinals and distinguished ecclesiastics who were assisting at it:—how it was renewed in 1480 by Hans Bock; how Hans Hug Kluber in 1568, when the original fresco was fast disappearing, repainted it in oil with such success that no difference could be perceived between his work and the original:—and lastly, after narrating how it was retouched in 1616—and again in 1703—when the artist, being incompetent to the task, only spoiled the work which he was employed to preserve,—he tells us how, after its destruction had been determined on by the authorities for the sake of some improvements in the city, the same was carried into effect on the 6th of August 1805, at night, for fear of resistance on the part of the people.

The type of this Basle 'Dance' was the older one at Little Basle:—to which it corresponded generally, not only in the order in which the different personages were introduced, but also in the poetical couplets which accompanied each figure: and this again served not only as a type for one of the 'Dances of Death' at Lucerne, but also for that of Berne—the work of Nikolaus Manuel or Deutsch—one of the most extraordinary productions of its class, and the work of a man no less distinguished for his literary attainments, his services to the cause of the Reformation, and his patriotic zeal, than for his skill as an artist.

With the invention of printing and that of the art of engraving on wood this pictorial Morality was emancipated from the walls of the cloister, to which it had hitherto been confined,—and circulated in all shapes and forms throughout the length and breadth of the land. Among the earliest works of this kind is the series of woodcuts accompanied by low German verses—the *Totentantz*: of which the first edition is by some said to date as early as 1459—and of which the Lubeck edition of 1496 is perhaps the most remarkable. Of the numerous editions of the French '*Danse Macabre*,' or the Latin and French books of devotion, *Heures*, or *Hore*, illustrated with Dances of Death, the curious reader will find ample details in Peignot, Douce, or Massmann's elaborate '*Literatur der Todtentänze*.'—Of all the forms, however, in which it has been sought by a combination of moral lesson and pictorial skill to preach to the world the solemn lesson which the Dance of Death is intended to inculcate,—the series of woodcuts which first appeared in a work published at Lyons in 1538 under the title of '*Les Simulachres et Historiées Faces de la Mort*,' is by far the most striking. The whole style of these remarkable productions—the spirit of the design—the grouping—the drawing—all about them in short combine to point out Hans Holbein as the artist from whom alone they could have proceeded. The late Mr. Douce in his learned and elaborate treatise on this subject has thrown the greatest doubt upon this point, by showing that the author of the Dedication of this first edition to the Abbess of the Convent of St. Peter at Lyons speaks of the artist who had designed ("*imagine*") these engravings as then dead—that is, in 1538: while

Holbein, as it is well known, did not die until the year 1554. But in spite of this and other arguments advanced by our learned countryman,—Massmann, Rumohr, and the most distinguished critics in Germany continue to ascribe to Hans Holbein these admirable and unrivalled specimens of artistic skill,—which Rubens enjoyed Sandraart to study as the best means of becoming an artist. Be the designer of the Lyons Dance, however, who he may,—be the engraver of those masterpieces of wood engraving who he may—artist and engraver have each but one rival,—viz. the artist who designed and the artist who engraved the series of initial letters containing small figures of a Dance of Death which frequently occur in works from the presses of Herrgus, Frobenius, and others of the old Basle printers,—and respecting which Mr. Douce remarks, that "in delicacy of drawing, in strength of character, and in skill as to engraving, they may justly be pronounced superior to everything of the kind,"—and in another place, "they may in every point of view be regarded as the *chef-d'œuvre* of ancient block engraving, and to copy them successfully at this time might require the utmost efforts of such artists as Harvey, Jackson, and Byfield." Of the merits of this Dance of Death—which Zani, Douce, Otley, and all the best writers on Art have agreed in admiring,—and which unquestionably was engraved by Hans Lutzelburger—few have hitherto had an opportunity of judging, inasmuch as copies of the impressions are of the highest rarity. Thanks, however, to the skill of Heinrich Loedel, a few shillings will now place in the hands of all lovers of the beautiful in design and the delicate in execution fac-similes of these gems of Art—and show them that these productions of the graver of Hans Lutzelburger are among the most wondrous efforts of artistic skill which any age has produced. Nor would we, in recommending to our readers the little volume in which they are contained, overlook the well-condensed introduction to them for which we are indebted to Dr. Elissen.—We have already recommended Prof. Schlottbauer's fac-similes of the Lyons, or Holbein, Dance. They are, indeed, most truthful. In fidelity he is a fair rival of the engraver of the alphabet. But the author of the 'Literary Introduction' to the English edition of his plates has not brought to the task all the curious learning and familiarity with his subject which the German editor displays.

The last work on our list—having its origin in the convulsions which are agitating the whole face of the Germanic Empire—is one of the most artistic productions of the kind ever called forth to illustrate the passing events of the day. Though the last, it is not the least successful of illustrations that

Mors sceptris iligibus equat.

Annals of India for the year 1848. An Outline of the principal Events which have occurred in the British Dominions in India from the 1st of January 1848 to the end of the second Sikh War in March 1849. With a prefatory notice of the circumstances which led to our commerce with the Punjab. By George Buist, L.L.D. Bombay: Printed at the Times press.

From the statements of his preface, Dr. Buist seems to have contemplated for several years past the establishment of a kind of historical year-book or annual register for Hindustan. His "Narrative of the Campaigns in Afghanistan and Scinde in 1838-1842" was in part a realization of this scheme. Circumstances have prevented him from following up that work with a yearly issue until the present time:—and we have now the first real specimen of his project before us for judgment.

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To the idea on which his scheme is based we can have no objection. On the contrary, if well conducted, a yearly *résumé* of all facts of interest connected with the history, politics, social development and moral condition of our vast Indian Empire could not fail to be of use and value to a large class of readers. Even without the spasmodic excitement created in this country by military movements in Hindustan—and we have no wish to have more campaigns like the Sikh struggles of 1845-6 and 1848 in order to add new brilliancy to our warlike annals—there is more than matter enough in the mental and material movements of that vast country to furnish a yearly volume. In the Annals of 1848, the fierce struggle which led to the annexation of the Punjab occupies the theatre and commands all the attention. The accidents of the year have therefore rather prevented this issue from being a fair specimen of what the reading public may expect from the future labours of Dr. Buist in this department. But we see no reason why he should not succeed. The field is open. Few Englishmen see the papers of Bombay or Calcutta; and as a matter of course London journals take note only of such events in that country as possess imperial or political interest. Such a *précis* of events as we possess in this little work is convenient for even the closest observer to have at hand for reference:—to the general reader it will be of assistance in connecting the various threads of his information, filling up gaps, and systematizing his daily reading.

As we have said, the present volume is taken up with an account of the Sikh campaign on the Jhelum and the Chenab. Dr. Buist treats of the whole matter in a contemptuous tone. Like many of the officers whose letters appeared after the sanguinary battle of Chillianwallah, he seems to think that in an early stage of the insurrection it might easily have been suppressed. In May, when the disaffection had not yet extended to above five thousand men, he says, a small force was applied for and refused. Two or three regiments might then have sufficed to restore order. But the danger was suffered to grow apace until a grand army had to be sent into the field, to win new laurels and honours for its Commander-in-chief,—and the crushing of a large revolt afforded a pretext for putting down the native government, disbanding the Khalsa, and annexing the country of our old friend and ally Runjeet Singh to our already over-grown Eastern Empire.

It was during this period of armed impunity that Lieut. Edwardes so distinguished himself. Let us extract from these "Annals" the account of his celebrated action of the 18th of June, which made such a sensation at the time in England:—

"At this time the troops of Lieut. Edwardes and Col. Cortlandt had joined; success had on various minor occasions attended their arms; Dhera Ghazee Khan had fallen into their hands, and the whole of the territories just beyond the Indus were in their possession. The Nawab of Bahawalpore, who had been applied to for assistance when Capt. Edwardes had reason to believe his troops in extremity, continued to make preparations for advance when he knew matters had mended; and was recommended by Sir E. Currie, resident at Lahore, to proceed as he had proposed to have done from the beginning. The whole of the Bahawalpore troops, amounting to about 6,000 horse and foot and nine guns, under Futeh Mahomed Ghoree, crossed the river on the 20th and 31st of May, and reached Jellalpoor on the 3rd of June. A small detachment of 80 Bahawalpore horsemen having been sent ahead to occupy a considerable village on their line of march, unexpectedly found themselves in presence of a body of 700 Mooltanees who had been driven from the Derajat by Lieut. Edwardes. The fortune of the

conflict, with numbers so unequal, could not long be doubtful, and the lesser party, after being roughly handled by the larger, retired. On the 10th and 11th of June, Lieut. Edwardes crossed the Indus with his forces, having left at Dhera Ghazee Khan two guns, 300 horse and foot, and also the Katar Mohie Regiment, just arrived from Punnoo. On the 14th, the enemy, who had moved out to meet them, and were most anxious to prevent a junction, crossed the Chenab, with the exception of about 1,000 men and two guns, which at first halted at Khan Ghur, but made the passage next day on seeing our onward movement. On the 15th, Lieut. Edwardes and the mounted branch of his forces reached Khan Ghur also: on the following day the guns and infantry under Col. Cortlandt joined him there. Their camp was pitched about a mile from the Chenab, the enemy being encamped on the opposite side: they were expected to steal off during the night. The great point was to effect a junction before any attack should be made upon them, and much anxiety was consequently felt at the want of means to get across. However, finding that all the boats at Khan Ghur were in the possession of the enemy, the force marched down twenty-four miles to Gungawallah, opposite to which the Bhawal Khan's force was encamped, about three miles from the ferry; and here there were some forty-five boats found available. At midnight Edwardes managed to cross some 3,000 of the new levies, who joined the Bhawal Khan by early dawn. The enemy were now encamped at Bugurarah, some eight miles from the ferry, and four from the Nawab's force. Thus stood affairs till about $\frac{1}{2}$ past 6 A.M. on the 18th, when Lieut. Edwardes himself crossed. He had scarcely landed when the enemy, who had marched from Bugurarah (seeing the Bhawal Khan's force on the move) opened on them with their great guns, which they returned, but were pressed so heavily that their right was obliged to fall back. On their left Lieut. Edwardes had posted himself with the new levies, who were all dismounted, sufficient boats not being at hand to cross the horses. With this handful of recruits (most of them boys),—without cavalry, and without guns,—Lieut. Edwardes bravely held his position, and without yielding an inch. The enemy had ten guns, four regiments of infantry, and a large body of cavalry, in all about 8,000 men; while, on the other side, the Bhawal Khan's force consisted of eleven guns, two regiments of infantry and cavalry, amounting nearly to 9,000. The action, which commenced soon after sunrise, raged incessantly till about 2 P.M., when the enemy, finding that the Bhawal Khan had fallen back on the right, made a desperate attack on Lieut. Edwardes with the whole of their force. His position was now one of imminent danger, his guns not having yet arrived; only one or two of the Nawab's at this time were firing. Now turned the fortune of the day; for, at this critical moment, two of Col. Cortlandt's regiments, with two guns, arrived, speedily followed by more, which did good service. The regiments behaved bravely, and the guns, with grape and canister, poured destruction on the foe. Six guns were taken at the point of the bayonet, and the enemy followed several miles. Their loss must have been very great: all their camp baggage and stores having fallen into our hands. Two guns they managed to carry off. The remnant of their scattered force fled to Mooltan, which was only twenty miles distant. Our loss was comparatively small, considering that the battle lasted from 7 A.M. till past 3 P.M. Though Col. Cortlandt and the men who were with him followed each other as fast as they could pour out of the boats, literally running across the intervening space to join Lieut. Edwardes,—yet the first two regiments and guns may be said to have given the turn to the day, and settled the affair: till these arrived, the action was very severe and doubtful. Edwardes worked hard, and was in advance of all,—where, in fact, he had been the whole morning. He had rather a narrow escape, a ball having passed through his sleeve under the arm. The Sikhs fought desperately; they charged three times sword in hand. Our guns poured grape and canister on them, but it was a hand-to-hand fight several times during the day, and many were found amongst the dead who had received their death-blows by sword cuts. Thus ended the Waterloo of the Punjab, as it may well be called, being fought on the glorious anniversary of

the 18th of June. The loss in killed and wounded—at first, as usual, enormously exaggerated,—is said to have amounted on the part of the force of Lieut. Edwardes to 100; on that of the Bhawal Khan to 200—or on our side to 300 in all: Moolraj having had 380 casualties. It is probable that not 200 dead of all the armies were in all left upon the field."

The action, however, led to no result: for Edwardes was short of artillery and the enemy lay safely under shelter of the guns of Mooltan. The defence of this stronghold is one of the most heroic incidents of modern warfare: and its fall one of the most terrible tributes to the force of breaching cannon yet put upon record. In many respects this gallant defence is more interesting than the battles of Chillianwallah and Goojerat: and we transfer the closing scene of this imposing drama to our pages:—

"The counterscarp having been blown in, on the 18th of January, tremendous salvos of artillery continued to be hurled against the works from a distance of some score of yards: while huge howitzers dashed shells bodily right into the walls; and these bursting, after burying themselves deep amidst the brickwork or mud of which the defences were composed, acted like so many mines, tearing off vast fragments as they exploded. On the 20th, two practicable breaches had been established, and the storming parties had been told off. To the Bengalees that on the southern side was assigned, while the Bombay troops were to penetrate that on the north. The attack was to have been made at daybreak on the 21st, but was countermanded. On the 21st, the order was re-issued,—it was to be carried into effect on the following morning, under the same arrangements as before. On the evening of that day a messenger was seen issuing from the gate, and making his way on foot to camp. He was taken to the General's tent, and after an interview of some duration returned on horseback. The garrison had agreed to an unconditional surrender,—Gen. Whish probably assuring them that their lives would be spared, though no pledge to this effect could be given. The troops were drawn up at daybreak on the 22nd: they formed two long lines extending from the Dowlat Gate. The street betwixt the living walls of armed men was about fifty feet in breadth. They waited some hours under heavy rain, on their guard in case of treachery or surprise; when about ten o'clock a messenger appeared, intimating that the garrison was at hand. First appeared about 200 ill-clad miserable wretches, who seemed broken and dispirited; then followed about 3,500 hardy, trained, stern and stalwart-looking men: they had defended the fort to the last, and abandoned it only when no longer tenable. They looked as if they would have fought to the death in the breaches, if such had been the will of their chief. They brought camels and horses, and large bundles of things along with them. These, together with their arms, were placed in charge of the prize agents as they passed. At last came Moolraj and his brethren and chiefs,—the last, as became him, in the retirement. He was gorgeously attired in silks and splendid arms, and rode a magnificent Arab steed, which bore no marks of suffering or privation, with a rich saddle-cloth of scarlet. No small curiosity was experienced to discover the appearance of one who had maintained a defence obstinate and protracted beyond any related in the annals of modern warfare. He but little exceeded the middle size; was powerfully but elegantly formed; his keen, dark, piercing, restless eyes, surveyed at a glance everything around. He neither wore the face of defiance or dejection, but moved along under the general gaze as one conscious of having bravely done his duty, and aware of being the object of universal regard. He was taken to the General's tent, where he gave up his sword: this is said to have been returned him. He was now placed in charge of Lieut. Henry, of the 19th Bombay N.I., who had quitted the personal staff of the Governor of Bombay to be present with his regiment at the scene of action. Moolraj seems to have been actually adored by the people, and no stronger evidence of this attachment and fidelity can be given than that supplied by the fact that though for a fortnight his defence was known to be desperate,—though hundreds were being slaughtered daily, and no result whatever could be looked for but death or captivity,—no one

ever threatened to abandon him, or thought of betraying him. He was spoken of by all in terms of the highest respect and deepest attachment—as a man not more brave than he was generous and just. It now became necessary to separate him from his brethren and chiefs, and the separation is represented as having been most touching. There were eighteen of these of higher rank than the rest, who had been with him through all his adventures. They threw themselves at his feet, wept sore as they were parted from him and might not hope to see his face any more."

The following letter, written by an officer of the conquering army, gives a graphic account of the interior of Mooltan when the English entered:—

"Fort of Mooltan, 25th Jan. 1849.—There is so much duty for those left in the fort, that I have not been able to spare a moment for writing the promised details of the 'Lions,' &c., of the place. The day before yesterday Major Wheeler commenced his researches for the reputed wealth contained within these walls: he was accompanied on the occasion by an old bed-ridden Mistree of Sawun Mull's time; thus was a clue obtained to the whereabouts of those vast subterranean storehouses of which we had heard. The principal of these were pointed out in this open ground within the citadel, as also among the ruins of the explosion. Some of these contain a large amount of silks, others ghee, and grain stored up in the life-time of the late Dewan's father;—there is also a great collection of opium, indigo, &c., worth a large sum of money: two or three lakhs of rupees were blown up with the vast chaos of valuables. When the rubbish shall have been cleared away from the entrance of the Tykanahs, then we shall no doubt be able to extricate many of the bales of shawls and silks. In the mint a pretty good amount of silver and gold coin was found. Moolraj's house and the neighbouring Tosh-uhkhanah contained a great quantity, as also many valuable swords, and rich property of every description. The fort is reduced to such a heap of ruins that it will require many months to excavate and remove the fallen houses. The site of the explosion is marked by a long deep pit, around which buildings are piled on buildings, scarcely one brick remains on another; corpses, carcasses of animals, and every description of property strew the ground; the stench within the citadel is dreadful: there must be hundreds of men buried in the rubbish. The piles of huge stone shot have been hurled to a great distance, and the contents of large bombproofs showered far and wide upon the occupants of the place. The Bahawal Huk shrine is reduced to a mere wreck, but that of Shah Rookhn Alum has been more fortunate; it has escaped with only a few scars. It is a most massive structure, and from its great height commands a beautiful view of the surrounding country. On ascending two winding staircases, the parapet is reached: thence may be seen the snowy range, the winding course of the Chenab, the numerous canals, gardens and fields which dot the far spreading jungle; even Jhung, on a very clear day, is said to be visible. Within the courtyard of this shrine there is a newly built range of bombproof barracks: in these, some valuable property has been stowed away. Moolraj's house appears to have been once a good substantial one. It is unroofed, and the walls are knocked to pieces with our shells; he appears to have vacated it long ago. There is a large garden with raised walks, which appears to have been nicely laid out. Between this and the before-mentioned tomb there is an enormous domed magazine, surrounded by a dry ditch several feet deep. A trench has been cut to communicate with it under ground, and the surface being closely packed with logs of timber, a mine is suspected; double sentries have been placed as a precaution against accidents. The stables, godowns and arsenal are built in long ranges, behind the citadel wall; they are mostly protected by domed roofs of considerable thickness, but our shells have penetrated them, and set fire to the contents; many dead and wounded men on charpoys were found in them. In a large timber-yard, wheels for guns of all sizes, and zumbooruk saddles, newly made, are lying about in great profusion:—further on, near the ramparts, are two large brick

furnaces for casting cannon; an earthen mould of a very large one, intended to be made, lies close to them. The quantity of loose gunpowder in every hole and corner is surprising; the largest collections are those in the vicinity of the heaps of arms thrown away by the garrison before making their exit. Camp-followers and others seem utterly regardless of danger, for blazing piles of logs are met with at every turn. Some small explosions have occurred, but no one has been killed, though many have been seriously burnt. The soil appears made of lead. Bullets strew the ground like pebbles; the supply would have lasted for years had the garrison held out: cannon balls are equally common, from those stone ones of Broddighnagian proportions to the Lilliputian for one-pounders. Thirty-nine cannon have been counted, and four mortars (the largest of these has been knocked off its rude carriage by our shot). There is abundance of wall-pieces of all sizes and lengths; zumbooruks and muskets innumerable, with piles of matchlocks of every weight and size. Tulwars by thousands, and heaps of wooden and leather accoutrements for all the above weapons. I think Mooltan is the beau ideal of a Bunce's fort, or rather fortified shop; never perhaps in India have such dépôts existed of merchandise and arms, amalgamated as they are with avarice. Here opium, indigo, salt, sulphur, and every known drug, are heaped in endless profusion;—there apparently ancient granaries in the bowels of the earth disclose their huge hoards of wheat and rice; here stacks of leathern ghee vessels, brimming with the grease, fill the pukka receptacles below ground, there silks and shawls revel in darkness;—bales rise on bales; here, some mammoth chest discovering glittering scabbards of gold and gems;—there revel tiers of copper canisters crammed with gold mohurs. My poor pen cannot describe the variety of wealth displayed to the inquisitive eye. Tumbrils under strong guards have been moving to and fro with gold coin all the day. It is said three or four Krores are concealed in the fort; the place is alone known to Moolraj, who may eventually make such disclosures as would materially benefit his cause. The sappers are busily employed in filling up our trenches and approaches. I think we have taught the Mooltanee how to take a fortress, and they will probably profit by the tuition should affairs ever allow it."

This extract exhausts our space: or we could have wished to give some account of Sir Jamsetjee Jejeebhoy, the princely merchant of Hindustan who has so distinguished himself by his munificent liberality towards the poor of his own race—the schools of Industry at Bombay,—and several other matters. But for information on these matters we must refer the reader to Dr. Buist's volume itself.

Friends in Council: a Series of Readings and Discourse thereon. Book II. Pickering.

We have already [*Ath. No. 1022*] introduced this book:—and indeed its purport is sufficiently indicated by the terms of the title. Essay writing is, as we have observed, somewhat out of fashion; but a plan is here adopted of making it agreeable. The author gives a series of essays as contributed by the members of a friendly party for each other's amusement; setting each essay in the centre of a dialogue in which its subject and method are canvassed and further interpreted. Nowhere in this or the preceding volume is popularity aimed at:—on the contrary, a cold ironical scorn of it is everywhere expressed. Wherever we turn the leaf, we are told, either expressly or by implication—"This is no common book,—it is not for the vulgar:—prize it accordingly." And this is true. The book is, indeed, written by no common man. The practised pen is conspicuous throughout. Its aim is always ambitious—its appeal lies to the minds of statesmen and scholars,—its arguments all proceed upon an elevated level,—its style is polished to hardness,—not ornate, except in the case of an occasional figure artistically thrown in "to startle and

waylay." It affects a large extent of official information; and it demonstrates in its whole tone a love of poetry and art, and an acquaintance with men and things such as must be the result of much study and large opportunities for observation. There scarcely needed, after such evidences, a parody on the well-known epigraph to 'Philip van Artevelde,' to suggest the probable authorship of the work. It occurs at the close of the following citation:—in which our modern modes of political existence in England are severely satirized.—

"Then, as to the state, here is a constitution working in such a fashion that there is no man, however weak, unprincipled, or ludicrous, who may not fairly pretend to a seat in the chief council of the state; and where the government of the country, interested, subdued, is at times so feeble and so inadequate that, hopelessly, it allows those evils to go on which all men acknowledge to be evils, without attempt at averting them (look at the rail-road legislation of late years for that), and where, generally, measures, instead of being wisely and long prepared, are left to be originated by some chance,—by individual knowledge and impulses,—to be borne on by clamour and carried by combination from without. The honours of the state, to whom are they given? often to men industriously obscure, of whom, though they may have supported the Whig or the Tory interest in this borough or that county, the country in general knows nothing, and ought to know nothing. Then, if we come to literature, (which is to be the government always of the next age) what do we find but histories with insufficient research, fictions without truth, no metaphysics, no theology, and such a multitude of bad hurried books issuing from the press, that the art of forgetting is the main desideratum for a modern reader of modern books. If we look at the social life, dullness, ostentation and imitative-ness reign triumphant there. Here is a metropolis numerous as the army of Xerxes, (even in the annals of an historian not bound to provide for them) and which if a Xerxes could look down upon, piercing through the pall of smoke which covers its inhabitants and which they like to have about them, he would see them clustering together in ill-built, ill-ventilated, ill-placed houses, the social pleasures of the people tarnished by vice, encumbered by foolish ostentation, formed without art, partaken without comfort, and having no soul of pleasure in them. He would see this multitude dressed all alike, not suitably to what they have to do or to suffer, but in a dress adopted from the defects, the follies and the fancies of the most foolish of mankind. An author whom I have before alluded to, and from whom better things might have been hoped, exalts to the uttermost the fact, if it be so, of this age being free from fear of the faggot or the torture-chamber. Fear of the social circle, fear of the newspaper, fear of being odd, fear of what may be thought by people who never did think, still greater fear of what somebody may say—are not these things a clinging dress of torture? There are noble men in the world, but they do not say to each other, 'Brother, I am in doubt, in difficulty, in despair: come and tell me what thy soul thinketh.' A mean and cowardly reserve upon the most important questions of human life, is the characteristic of modern times. In few words to parody the saying of a great writer in depreciation of an age, perhaps, superior to this, we may say that we are living amongst second-hand arts, misleading letters, bad society—and, which is worst of all, continual fear and danger of the meanest aspects of public opinion; and the life of man gregarious, unsocial, whirling, confused, thoughtless, dull."

There is in this and other remarks an assumption of superiority on the part of the writer which might tell against him but that he justifies it by the mastery which he generally exhibits at once over his subject and over his manner of treating it.

There is a kind of series in these essays and dialogues. They rise from the less important to the more so. The first is rather slight in its structure and trite in its theme. It is headed, "Reading,"—and gives certain reasons against

of official its whole acquaint- must be the opportunities ed, after well-known to suggest It occurs—in which existence in

an indiscriminate exercise thereof. Here we find the author at issue with an illustrious predecessor—with Milton in his 'Areopagitica'—and also with the experience of some other great men, who have found miscellaneous reading a useful aid in expanding and storing the mind. For those, however, whose leisure is limited some "mode of managing study" is desirable;—and for such this essay is pregnant with suggestions that deserve attention.

The next essay, "On Giving and Taking Criticism," obviously addresses another class:—and to that class it gives much sound advice. In the dialogue by which it is introduced, we meet with the following graceful speculation.—

"I often think what interest there is in a picture quite independent of its subject, or its merit, or its author. I mean the interest belonging to the history of it, as a work of some one man's labour. I can imagine he was so joyous in the beginning of it: the whole work was already done, perhaps, in his mind, where the colours are easily laid on, while the canvass yet was white. Then there were the early sketches. He finds the idea is not so easy after all to put on canvass. At last a beginning is made; and then the work proceeds for a time rapidly. How often he looks back from the canvass, approaches it again, looks at it fondly yet wistfully, as a watching mother at a sick child. He is interrupted, tries to be courteous or kind, as the occasion requires, but is delighted when the door closes and leaves him alone with the only creature whose presence he cares much for just now. All day long his picture is with him in the background of his mind. He goes out: the bright colours in the shops, the lines of buildings, little children on the door-steps, all show him something; and when he goes back, he rushes into his painting-room, to expend his fresh vigour and his new insight upon the work of his heart. So it goes on. Let us hope that it prospers. Then there comes a time when the completion of the picture is foreseen by him, when there is not much room for more to be made of it, and yet it is not nearly finished. He is a little weary of it. Observe this, Ellesmere, there is the same thing throughout life, in all forms of human endeavour. These times of weariness need watching. But our artist is patient and plods on. The end of the drama approaches, when the picture is to go into a gilt frame, and be varnished, and hung up—like the hero of a novel upon whom a flood of good fortune is let in at last."

There is a certain humanity in the above extract, all the more striking from the prevailing cynicism of the book from which it is taken. Other remarks, on the world's real want of sympathy for men of genius, touch however a tender chord within us:—but we must pass to sterner matter.

From such themes as we have indicated, the author gradually rises to "The Art of Living,"—"The Improvement of the Condition of the Rural Poor,"—and "Government." These are arguments into which the principle of utility enters:—and these essays take their tone from it. But there are in them, nevertheless, occasional passages of sedate beauty: such as the following.—

"History is chiefly a record of the failures of Government. This is the usual current of human affairs: it does not become any of us to complain immoderately of it, or to pride ourselves upon discerning it. But we may strive to lessen an evil which will not be eradicated as long as men are men. Turning now to our own Government, we cannot but see that we have great advantages; and at this moment are looking on at the disturbances of the world with conscious superiority. We have, as I said, great advantages. The advantage of our position can hardly be overrated. Then the nature of the people. They are resolute, enduring, grave, modest, humorous. I lay great stress upon the last of these qualifications. Nothing corrects theories better than this sense of humour which we have in a greater degree than is to be met with, I believe, in any other people. An Englishman sees easily the absurdity which lurks in any extreme

proposition. Moreover, there is such a thing as fortune—or, as I would rather say, divine guidance—for nations as for individuals. That man must be very unobsequious, I think, and very unobsequious, who has not noticed in his own career turning points and important crises which could hardly be said in any way to have been brought about by him or to be results of his character. The same with us as a nation: we have had our disturbances at the right times, upon great subjects, and conducted by great personages. From us was to be the greatest colonization: and it seems as if we had been trained up with a view to that, accustomed early to independent action, as people who would have to seek their fortune in the world. Now, these considerations, far from puffing us up with pride, ought to make us fearful for ourselves and also kind in our judgment of other nations. We may remember, in estimating other nations, that the character of a people, as of an individual, may be greater than its history would convey: and, perhaps, the utmost we can say of our Government, supposing it to have been pre-eminent amongst modern governments, would be some speech of a similar form, though much more gracious in substance, to that which Talleyrand uttered with regard to our public school education, 'It is the best,' he said, 'which I have ever seen, and it is abominable;' so we of our Government may say, It is the best we know of, and there are a good many things to be mended even in it."

On Government appointments the author says:—

"But the difficulty is to find able men. To hear some persons talk, you would suppose that it was the simplest thing imaginable to make good appointments, and that it needed nothing but honesty on the part of the person appointing. But sound men of business are very rare, much more rare than any body would be likely to conjecture who had not had considerable experience of life. And what makes the difficulty greater is, that the faculty for business is seldom to be ascertained by any *a priori* test. Formal examinations of all kinds fail. For look what it is that you demand in a man of business! Talents for the particular business, the art of bringing out those talents before the eyes of men, temper to deal with men, inventiveness together with prudence, and in addition to many other moral qualities, that of moral courage, which I have remarked to be the rarest gift of all. As it is, very many men fail from a want of proportion in their gifts. Here is a man so clever that he apprehends almost anything, but there is a light flame of restless vanity underneath this superficial cleverness, so that it is always boiling over when you do not want it. One man makes it his business to doubt, another to fear, another to hope, another to condemn; one is the slave of rules, another cannot construct anything unless he have free space for his theories which this old world does not now admit of. Many of these defects are not fully ascertained until the man is absolutely tried ('Capax imperii nisi imperasset'). On the other hand, there are men whose talents for governing are not developed until they are placed in power, like the Palm-branches which spring out only at the top of the tree. But still these considerations must not induce men in authority to say that since choice is so difficult, it must be left to chance or favour, but it only shows how wary statesmen should be in their choice, and that when they once do get hold of a good man how much they should make of him."

In the distribution of public honours the essayist contends that merit should not be the sole qualification. He gives several reasons for this—more or less, as we think, unsound; but his crowning reason is, that the adoption of the principle would deprive disappointed men of the consolation which they now have "in the thought, which is a just one, that not only is merit frequently left unrewarded, but that oftentimes it stands fatally in the way of worldly success." The answer to this is easy. Notwithstanding the adoption of the principle, so many mistakes would necessarily be made, and so many misapprehensions would occur, that the disappointed would find as much consolation in the proved fallacy of human judgment as they now do in the felt injustice of fortune.

The volume is closed with a long and elaborate essay on "Slavery:—on which subject Mr. Taylor seems to have thought deeply and read largely. He takes credit for having argued it thoroughly—and aims at a settlement of the question. Thus, he tells us—

"I shall endeavour to show that slavery is cruel, needless, unauthorized, mischievous to master as well as slave; that there are no races in respect to which the preceding propositions do not apply; and, finally, that slavery can be done away. If these things can be shown to any slave-owner, I think he ought to listen, and I think he will. After all, men are swayed by argument: they do acknowledge the supreme authority of reason. It may be said—look at the course of the world: where is your force of reason there? I answer, the truths of reason are darkened by sophism, blunted by exaggeration, and when 'immersed in matter,' as they must be in dealing with human affairs, there is a haziness and many-sidedness about them which render them very hard to apprehend. But bring them well out, and men must obey them. Self-interest, passion, pride, everything goes down ultimately before sound reasoning. You may deny reason: you may deny the Sun. You cannot, however, even when blind, escape the genial influence of either. Hence the first of all things, in a great cause, is to reason it out well. When it is securely reasoned, it is gained. There remains much to be done by the head and by the hand, with the tongue and with the pen; and there may be many partial issues of success and defeat: but superior intelligences, if such regard mortal affairs, would know that the work was, spiritually speaking, done. Now I do not mean to magnify any literary attempt in this matter, much less my own, but simply to state my conviction of how the work is to be done. Only by profound and earnest investigation, which will lead in writing or action to enlightened and earnest endeavour. The unspendable misery which has been caused by partial and purblind efforts in the cause of slavery, makes one approach this subject with a feeling of awe, lest one should be adding any more crude ideas to be worked out in practical suffering upon other people."

In this essay, then, the reader is taught to expect no "crude ideas;" but to reckon on having his "philanthropy" placed under "the guidance of wide-seeing thoughtfulness." One sentence has to us a pregnant meaning—"The slaves are uneducated, here from policy, there from neglect." This condition of slavery unhappily has been shared by the supposed freeman; and it was only lately that the right of the peasant to the education of his children has been acknowledged—even now it is not fully acknowledged. Until it shall be so, he and his children are still so far serfs—without the advantage and protection of ownership. Much more yet goes under the name of liberty than is really entitled to the appellation.

In one of the illustrative dialogues on Slavery we meet unexpectedly with an episode on dancing—which we must quote.—

"Milverton. Well, I was going to tell you that it was not upon the stage, or amongst professors of the art, that I had seen the most beautiful dancing; but amongst peasants and artisans. There is a certain Spanish saint, called St. Isidro, a shepherd saint, the tutelary of Madrid, and much venerated by all classes in that city. I was there on his festival day, when all Madrid flocks out to his chapel, two or three miles from the town; and there, in family parties, the citizens have their dinners and recreate themselves. On the occasion that I was present at, the weather was perfect. It was emphatically a day: often in that Babel you laud so much at times, Ellesmere, the sun with all the good will in the world to do so, cannot make a day of it: and sorrowfully leaves eighteen hundred thousand persons unsustained by his life-giving rays. It needs for you to be very clever and very amusing people to make up for this."

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"Milverton. Well, as I said, it was a day. No icy wind from the neighbouring sierras came down upon us with the hot sun, making a combination,

like a false man's kindness, to mock us. The air was warm and yet bracing. Altogether it was very hard for those who had to stay at home on that day. It was noon before I reached the place of concourse. The whole scene was like a fair,—not one of our coarse northern fairs, but the fair in a dream. Delightful bits of red and rich amber colour, which last the women much affect, came out amidst the colour of the fields and the corn. The whole length of the city overlooked the fields where the festival was kept. I made my way through the crowd which pressed up to the Saint's chapel, or which thronged about the tents for refreshment, and got out into the adjoining fields, where numbers of little parties were grouped about, some of whom were beginning to dance. All seemed happy. I suppose, though, there was the usual undercurrent of vexation: Juan absent from the little party where he was most longed for, and Beatriz not found in another which to some one was naught without her: or Catalina dancing coldly with Luis, to the heart-breaking of poor Pedro, who looked on at a distance, but might not join them. But these things were not visible to the stranger. I stood for some time in the outer circle of several of these sets of dancers, in a large, hilly field of irregular shape. Looking suddenly at the top of the hill, I saw against the blue sky the figure of a young girl dancing beautifully. I made my way to the little home-party which this 'phantom of delight' belonged to. It was on the extreme outskirts of the throng. The girl was about twelve years old, and was dancing with one of her brothers, as I conjectured. I sat down by the blind fiddler who was playing to them, and looked on. A light breeze waved against our backs the corn of the neighbouring field divided from us by no hedge. But how shall I describe to you this girl and her dancing? She was dressed in the commonest dress, with no choiceness in its arrangement; having on coarse clouted shoes, and long loose garments. Her face I do not distinctly remember: it was certainly not beautiful, only earnest. But she danced in the most consummate manner you can conceive. It was the expression of the height of passionless joy, in the utmost grace of movement. She wanted no admiration, had no other foolish thoughts; but only said, as it were, to the bystander, 'I am very happy, and this is how I tell you so.' Her brother, a graceful, fine youth, better dressed than his sister, quitted the dance, and another brother succeeded. Still she danced on. She tired him out, too; and the first brother then came on a second time. But there was no weariness in her. She threw her hair off her face, and went on again. She had a spectator as untiring as herself, for, I believe, if she had continued dancing till now, I should have still been watching her.

"Dunsford. And what did you think of all this time?"
"Milverton. Ah, well, I thought of many things. I thought how the girl's talent for dancing would be noticed, and she would be brought upon the stage; and then I fancied the proud disgust with which she would listen to the applause given to inferior dancers at the wrong place; and how, amidst the gilt-paper triumphs of such a life, she would look back, perhaps, upon this very day with fondness as a really happy day. And then, I remember, I thought how little we understand pleasure, and how we crush the delicate thing in our clumsy efforts to hold it. And I looked up at the splendid palace of Madrid, and thought of regal pomps and vanities. And then, how it was I know not, I thought of death. Perhaps anything very beautiful has that thought in the back-ground. But now the dance was stopped; the girl tripped off to fetch something; and the elders of the party moved away. I went also; and though I returned to the same place and sought afterwards in many other groups, I could not find again my beautiful dancer from the heart: nor, save in some auspicious dream, shall I see such dancing any more, I fear."

These extracts will have convinced our readers that the book from which they are taken is one which it is only bare justice to praise highly.

Little Fadette—[*La Petite Fadette*]. By George Sand. Jeffs.

Who can have forgotten the sudden up-springing of a curious crop of light literature which fol-

lowed the French Revolution of '30?—Fierce, passionate, distorted—not to say deformed,—though it was, it had nevertheless a character and a physiognomy of its own which will make a figure in the history of European *belles lettres*. No appearance in any respect analogous has attended the turning-out of the Citizen King and the subsequent ferment among our neighbours. The Socialists have not been able even to fit up a new 'Marseillaise.' 'La Foire aux Idées' was but a temporary and trumpery substitute for 'Bertrand et Raton.'—The very *Charivari* has lost its point: while the already popular romancers and guardians of public morals, who should be still in the prime of their powers, appear to be withering, shrinking, fading—oppressed by strange lethargies, like persons who had unconsciously been imbibing slow poison. We are not, like M. Janin, convinced that when French intellect and imagination languish, the whole world also must needs be ailing and nod:—for the present, at least, getting no further than the fact, without its asserted consequences.

Few of the authors of France may be thought to have resisted the influence of the times better than Madame Dudevant. Yet even for her masculine energy they appear to have been too strong. Her eloquence and her command over gracious and delicate descriptive power still remain,—but her earnestness seems weakened, and her continuity of effort fails her in her last novel sooner than usual. Like some of its immediate predecessors, 'Little Fadette' is a story of peasant life, containing not much incident and but few characters. In such a task there must have been found a welcome repose after the fierce and feverish labour of concocting *Red* manifestoes for an unsuccessful party;—and, accordingly, certain of the pages in 'Little Fadette,' may rank with some of the author's best in 'André,' and in 'Master Antony's Fault,' and with the delicious opening of 'Jeanne.' But we are teased with inconsistencies—with preparations which are followed by no fulfilment. Too often are the characters forced to utter the author's high-flown poetry, not their own feeling or folly. Be it remembered that the slighter or simpler the invention is, the more clearly evident becomes any fault in manipulation or flaw in texture.

The tale runs thus.—A certain peasant's wife gives birth to twins, boys—Landry and Sylvinet. Such an event makes a stir in the hamlet-world into which the babes are born. All manner of old superstitions peer out of their holes and corners on the occasion. The mysterious sympathy betwixt twin and twin—the necessity of counteracting this, by encouraging in each his individualities of character by educating both to labour and take pastime apart one from the other—the preternatural affection of the pair, and the point at which their concord of taste and disposition branches off, in Landry taking the form of courage and independence, in Sylvinet that of jealousy selfish exaction calling itself brotherly affection,—these things are indicated in Madame Dudevant's most convincing manner, and their development foretold, we thought, a psychological story of more than ordinary interest. This class of fictions may not be wholly clear of morbidity—but a good specimen is always welcome: and for some such novelty we have not ceased to hope from Madame Dudevant.

But 'Little Fadette' does not fulfil the expectation. Sylvinet's jealous and irrational affection for Landry, which leads him to meditate suicide under the common but distracting idea that his affection is unrequited, is the means of introducing into the story its heroine. From the moment of her introduction, the twin-work

of the tale ceases to possess any importance; and we enter upon other passions, other characters, other combinations. Landry undertakes to search for the truant; and all other expedients failing, resolves to have recourse to "a wise woman,"—one Mère Fadet,—who is reputed by her neighbours to have dealings with the supernatural world. We cannot but dignify for an instant, to notice the generic hankering which the modern school of French ultra liberal writers cherish after everything legendary, credulous and symbolical. Staunch lovers of new ideas as they profess themselves to be, they seem never so well contented as when they can toy with, and rest themselves among, the "creeds outworn," the child-like fancies and fears of those belonging to the *ancien régime* whose ignorance or bigotry, misery or tyrannical luxury, they are never tired of satirizing. Does this vaunted Utopia of theirs afford them no poetic dreams to which they can trust themselves? The phenomenon is of sufficiently frequent occurrence to justify the question. It is clear in the case before us that Madame Dudevant has found no small amount of artistic pleasure in "the bad report" of her heroine. Little Fadette is the grand-daughter of the above-mentioned Mère Fadet,—a small, swarthy, bright-eyed, limber-tongued creature,—nimble, curious and spiteful; who allows peasant children to imagine that her familiars are Jack-o'-Lantern and Will-o'-the-Wisp,—and who torments the elders by telling them truths "more homely than comely," and by dragging out all their secrets to common daylight. Upon her stumbles Landry who is in quest of his morbid twin brother. She teases the poor boy—but ends in pointing out the retreat where the truant is lurking—claiming, as all such help do, some mysterious recompence, to be paid her on a future day. But Landry, like too many grown men, is somewhat sluggish in his gratitude:—being ashamed of his benefactress. Time passes,—and a second service must needs be rendered by her to him ere he does his part. This, to put the matter in town phrase, merely amounts to his patronizing the Pariah girl at the village dance on the Saint's day. Alas, for the vaunted simplicity of peasant life! Landry is as cruelly jeered at for his chivalry as though the scene were a *guinguette* on the outer boulevards of Paris. Poor, ugly, unpopular Fadette is insulted by the rude boys; and he defends her as a Christian should his partner,—with his grand-daughter though she be. Their dance on the day of St. Andoche is the critical moment to both youth and maid which the wise ones say comes only once in a lifetime. It is the signal, too, for Madame Dudevant to begin her harlequinade. By way of rescuing Landry from immoderate contempt, and of explaining Fadette's power at once to assist and terrify her neighbours, she there and then shows the girl to be as thoughtful as a sage, as wise in theology as M. Lamennais himself, as delicately refined and self-sacrificing in her love as a duchess,—supposing that delicacy and refinement go by precedence. She even goes the length of taming the capricious and saucy Fadette, and making her presentable, not to say inviting, in appearance within a single week:—such miracles can love and Landry work! We fear that Madame Dudevant's faith is greater than that of her critics. Such transformations do, we allow, occur in a Christmas pantomime; which we visit expressly to be startled by seeing an orange tree in a vase become a jockey, whipped, spurred and booted,—and similar delightful impossibilities. In Life and Nature—such, at least, as the artist must resort to by way of treasury—they do not exist. From this miraculous dance and metamorphosis to the close of the tale it is interest

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drivindles; since the residue merely narrates how this admirable little Fadette "winds every one round her finger," till her marriage with Landry is held to be as desirable by his family as it was at first thought disgusting. To effect this conversion Madame Dudevant has had recourse to the vulgar expedient of making her heroine turn out an heiress:—her story thus losing all its worth, wit, and morality. Had the device been employed by a common artificer for the novel-market it would have excited no surprise; but Madame Dudevant aspires to the reputation of an artist and a prophetess. Does, then, her above acknowledgment of the authority of the Golden Calf betoken that she is losing her faith in despair and defiance as inspirations, and endeavouring—albeit erratically—to enter within the hedges and barriers of *rehabilitation*? This is no new step in the career of those who, like herself, have flung themselves into life and upon literature as iconoclasts,—root and branch exterminators of social evils. That so many should arrive at it sooner or later, is a fact at once melancholy and instructive.—By those who do not seek to be made thoughtful or wise in their pleasures 'Little Fadette' will be found a peculiar and welcome "piece" of light summer reading.

OUR LIBRARY TABLE.

Fairy Tales and Romances. Written by Count Antony Hamilton, author of the 'Memoirs of Grammont,' translated from the French by M. Lewis, H. T. Ryde and C. Kenny.—Although we cannot but feel that this book belongs to a gone-by taste and manner, some knowledge of it is almost indispensable to a full understanding of Horace Walpole's wit. Attracted by sundry sympathies to Count Hamilton, his illustrations to the persons and adventures in the 'Four Facardins' are countless. But it seems to us, on trying to force our way through the labyrinths along which the Master of Strawberry Hill delighted to saunter, that his fancies of Faery Land differed from ours as widely as did the court petticoats of which architect Kent designed the ornaments from the less academic garments now issued by Mdle. Dery! These tales appear to us cumbrous and entangled; their satire insipid—and their meaning rather unmeaning. Measured against Voltaire's philosophical stories, or Dean Swift's bitter caricatures, they are pignies indeed; and their popularity with him who loved to quote them, is but another proof of the factitious value with which genius can invest that which is essentially mediocre—at once giving to trifles the importance, and turning them to the use of, treasures.

The Disease and the Remedy; or, Parochial and National Emigration versus Parochial and National Pauperism. By Philo-Humanitas.—An earnest and well written appeal to the authorities of parish and nation on behalf of the pauper class and the rate-payers:—whose interests are equally concerned in the speedy adoption of some means of relief for the overflow of pauper population. We are compelled, however, to say that Philo-Humanitas is but indifferently correct as to his facts:—the consequence of taking them from partizan writers. For example, he quotes from Mr. Alison that in Lancashire population doubles itself in thirty years, crime in five years and a-half. Here are two assertions,—both of them inexact. Population doubles in less than thirty years—and crime does not increase at all! On the same authority it is declared that "all over the empire serious crime is augmenting four times as fast as the numbers of the people." A mere glance at the Criminal Returns would have shown the writer the glaring inaccuracy of this statement. These figures—which admit of no dispute or quibble—prove that not only is there a considerable *diminution* of the mass of crime committed in this country—a diminution proceeding with almost the steady march of a law—but also that the change for the better is in the more serious crimes, except murder; which as it is generally the result of sudden inspirations of hate, cupidity, or anger, is less subject to the controlling influences of the forces that are now operating upon

society for its amendment. These errors of data falsify a good deal of the reasoning of Philo-Humanitas.

Introductory Lecture delivered at the Opening of the Metropolitan Evening Classes for Young Men. By F. D. Maurice, M.A.—A report of an able address, well deserving of extensive circulation among the youth of the metropolis. The opening of these Evening classes for studies analogous to those of University College, at rates which bring them within the reach of very humble means, ought to prove an epoch in the educational history of London.

Essays on History, Philosophy and Theology. By Robert Vaughan, D.D. 2 vols.—These essays are reprinted from the *British Quarterly Review*; and in their present portable shape will no doubt be a welcome offering to the admirers of Dr. Vaughan. The articles on Puritan literature and history are especially remarkable, and will repay the reader of seventeenth-century annals for his trouble in going through them.

An Analysis of the First Decade of Livy, with Examinations, Questions and Notes.—Analysis of the Second Decade of Livy. By a Member of the University.—These two little volumes are the earliest of a series of translations on a novel plan, from the Latin historian. The translation is called an "analysis,"—but it is nothing more than an abridgment, the idea being, apparently, to cut away from the narrative of Livy all the passages deemed of doubtful historical authenticity, and form what remains into a connected story. Niebuhr is of course the authority on which the text is mangled. We confess to a strong repugnance to such a mode of dealing with an ancient author. In the case of Livy the objection assumes a peculiar strength. There is a unity in his writing—a proportion—a harmony of tones, which cannot be meddled with without detriment to their peculiar beauties, and even to their historical value. Thus garbled, they are no longer Livy. Should the present "analyzer" think fit to write a history of Rome, he is of course at liberty to reject any legend or too romantic incident which his judgment may pronounce unworthy of credence: but he must put his own name on his title-page—not that of another. A legend is often as historical as a fact—indeed it becomes in turn a fact. What if modern scepticism deny the merit of Scævola and the Martyrdom of Regulus? The ancients believed in them—and is not the general conviction of their truth itself a fact of importance? History is but a map of the mental and moral progress of mankind:—and facts are valuable, even in an historic sense, only in so far as they illustrate this progress. There is no temerity in saying that there are stages in the growth of society in which popular legends—ever the concrete expression of those ideas which have exercised most influence in the formation of a people's character—are more useful for this end than any material or outward fact can be. We can give only a very qualified approval to this undertaking. Few boys, we apprehend, will exchange the glowing page of the original for the colder narrative of the "analyzer"—which has not even the excuse of being critical as a set-off against its dulness.

LIST OF NEW BOOKS.

Alethea, or the Maid of the Desert, by Sarah Barrett, 18mo. 2s. cl.
Angels' Theme (The), a Poem, by J. Watson, 12mo. 2s. 6d. cl.
Arnold's Handbook of Geography and History, Medieval, 4s. 6d.
Arnold's Commentary on the New Testament, vols. post 8vo. 1s. 1s.
Bell's (T.) History of British Quadrupeds, 8vo. 12s.
Burns's (James) Christian Philosophy, 2nd ed. post 8vo. 3s. cl.
Chemistry and Physics, by a Practical Farmer, 8vo. 6s. cl.
Chesters' (Rev. B. and Rev. W. B.) Poems, cr. 8vo. 7s. cl.
Cumming's (Rev. Dr.) Infant Salvation, 12mo. 2s. cl.
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Fut's Anatomy of External World, ed. Dr. Knox, pt. 2, 16mo. 12s. col.
Haselhurst's (G.) Penmaen-Mawr, a Poem, post 8vo. 6s. cl.
Hawes on the Sacrament, new ed. by Rev. H. White, 32mo. 1s. 6d. cl.
History of the Picts or Romano-British Wall, 8vo. 3s. cl.
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Mamma's Own Story Book, by the Author of 'Chick-need,' sq. 3s. 6d.
Martindale's (J.) The Farmer's and Gardener's Guide, cr. 8vo. 3s. 6d.
Nelson's Memoirs, by J. T. Pettigrew, F.R.S. 2nd ed. 2 vols. 8vo. 12. 10s.
O'Connell's (John) Recollections of a Parliamentary Career, 2 vols. 21s.
Old World and the New, by Mrs. Trollope, 3 vols. post 8vo. 1s. 11s. 6d.
Pennington's (J. W. C.) Life, The Fugitive Blacksmith, 12mo. 1s. 6d.
Simmons's (G.) The Working Classes, Their Moral Condition, 2s. cl.
Slater's Shilling Series, The President's Daughters, 18mo. 1s. cl.
Stewart's (W.) Grammar of the English Language, 18mo. 1s. 3d. cl.
Trap to Catch a Sunbeam, by Author of 'Old Jolly,' 24. 3d. 18mo. 1s. 10s.
Tripp's (Rev. H.) Selections from Percy and Evans, fc. 4s. cl.
Ware's (H.) The Life of Our Saviour, 5th ed. 18mo. 2s. 6d.
Wilson's (H.) Geography simplified, 3rd ed. corrected, 18mo. 2s. 6d.

DOLORS IN THE CHURCH OF ST. CUNEGUNDE.

Storm under heaven—no moon, no star; but by the moaning sea,
In the convent church of St. Cunegunde, *thrice* deep the shadows be,
Night, and the Doom of God, and Death, are there, —the awful Three.
She lieth in shroud on the catafalque; and the taper's fitful glare
Giveth ghostly light to the pallid brow, and the black and sweeping hair,
And the unclosed eyes, one tale that tell—one fearful tale, despair.
She lieth a corpse on the catafalque, what time the priest doth pray,
In the choir, to the good St. Cunegunde and the mother of God, alway,
While the incense-smoke around the bier up-curl eth dim and grey.
Despair, despair! through the priestly chant—for ever and aye, despair—
St. Cunegunde, Mary, mother of God, they heed nor vow, nor prayer,
For the unclosed eyes one tale reveal,—one tale, despair, despair.
Draw near, lift up the pall,—behold! oh, rich and perfect form,
Oh royal brow, and lip and cheek unmarred by strife and storm;
Meet shrine was that for lofty soul, ere flawed by mortal sin,—
Meet, the rapt worship of the world to challenge and to win—
Meet shrine for passion—holy saints! 'twas passion dwelt therein!
Her life was passion: on one die each earthly hope was thrown,
All hope—it failed,—heaven's lightnings fell, and smote their victim prone—
Lo, on the gilded catafalque, she lieth here alone!
Vain, vain the uplifted palms,—ay, vain that sweet and solemn song:
Hence black stole'd ministrants, depart, with all your chanting throng!
But ye, saints, martyrs, angels, all that breathe heaven's blessed air,
Divide, make way before the throne, for one heart-broken prayer,—
God, God, the all-merciful! Christ-God! revoke that doom, despair.
BRUSSELS. T. WESTWOOD.

MILTON'S WIDOW.

It is somewhat surprising that the biographers of our great epic Poet have afforded so little information on the subject of his widow: her connexion with such a man might have awakened some curiosity respecting her history and character, even if she had not been his "very kind and careful" companion in affliction and blindness, and during the period while he was engaged on his immortal work. The notice, which I observe in a recent number of your journal, of Dr. Marsden's paper read at the meeting of the Archaeological Association at Chester, affords a fitting opportunity for inviting attention to the subject. I know not what new facts may have been communicated by that gentleman; but as I believe the proceedings of the Archaeological Association are not published, I venture to think I may be able to add something to the stock of public information from some papers in my possession connected with the affairs of Milton and his family. They consist principally of legal documents, formerly belonging to Mr. Boswell, of Lincoln's Inn, the supposed dispenser of which, at the sale of his Library and literary curiosities in 1825, is noticed by Mr. Todd in his 'Account of the Life and Writings of Milton' (1826), page 290. To afford a clue to their resting-place, in the event of any future opportunity arising for making them available to the cause of literature, I beg to inclose my card.

Who was Elizabeth Minshull, the third wife of Milton? If we refer to Todd's work, as one of the most recent authorities on the subject, we find that she was the daughter of Sir Edward Minshull, of Stoke. Before venturing to dispute a statement adopted by so respectable an authority, it will be prudent to examine the evidence on which it rests.

Certainly there is no authority for it in the works of the cotemporary biographers of Milton. Aubrey's

statement is:—"He mar'd his 2^d wife, Mrs^{is} Eliz. Minshull, A. * * * (the year before the sickness), a gent. person, a peaceable and agreeable humour." (*Aubrey's MS. Notes, Goodwin's Lives*, 337).—Philips, the other cotemporary biographer, writes:—"There [in Jewin Street] he liv'd when he married his 3^d wife, recommended to him by his old friend Dr. Paget, in Coleman Street." (*Philips' Life of Milton, Goodwin's Lives*, 378). "By his third wife, Elizabeth, the daughter of one Mr. Minshal, of Cheshire, (and kinswoman to Dr. Paget), who survived him, and is said to be yet living, he never had any child. (*Ibid.* 380.) The statement of Toland, who wrote in 1699, is similar:—"As soon as his pardon was past the seals, he appear'd again, and marry'd his third wife, Elizabeth, the daughter of Mr. Minshal, of Cheshire, recommended to him by his friend Dr. Paget." (*Toland's Life, reprint of 1761*, p. 117.) I have not an opportunity of consulting Wood's 'Athenæ' before despatching my letter; but as Aubrey's notes were used as materials for the article on Milton, it will probably not be found to differ from the above. Nothing new is to be found in any of the biographies immediately succeeding. Richardson, Newton, Johnson, Warton, Symmons, Hayley, &c., and even Todd in the Life prefixed to his edition of the works of Milton in 1809, follow the statement of their predecessors. Peck, writing in 1740, and referring to Crit. Diet. vol. 7, p. 581, repeats the information, and adds that "she died at Nantwich, in Cheshire, a few years ago." (*Peck's Memoirs*, p. 100.) Pennant, writing in 1782, says that "Nantwich was the residence of the widow of the great Milton during the latter part of her life: she was the daughter of Mr. Minshull of Stoke, in this neighbourhood." He has a reference at foot to Newton's life, and adds that, "she died in a very advanced age, in March 1726." (*Pennant's Journey from Chester to London*, Edit. 1811, p. 48.) It does not appear on what authority Mr. Pennant, writing more than half a century after her death, stated her to be the daughter of Mr. Minshull, of Stoke. Mr. Ormerod, however, in his history of Cheshire, adopts the statement; and after tracing the ownership of the Manor of Stoke to the family of Minshull, and quoting a note of Dr. Williamson to the effect that Edward Minshull, Esq., the great grandson of the purchaser, was lord thereof in 1701, proceeds to speak of the Minshulls of Stoke, who, he says, "in addition to their claim to notice as descendants from one of the most ancient families in the county (the Minshulls of Church Minshull), derive no inconsiderable interest from their connection with the chief of English poets." He informs us further that "the Acton registers previous to 1717 are destroyed, which does away with the possibility of giving the Minshull pedigree down to Milton's time in regular form," and that "the Cheshire pedigrees are silent on the subject; and a narrative pedigree, affixed to a monument in Nantwich, is concealed by the gallery. Dugdale, however, fortunately transcribed it in 1663." This pedigree is given in a note; from which it appears that Edward Minshull, whose descent is therein traced four generations back, and who was the purchaser of Stoke, married with Margaret, daughter of Thomas Mainwaring, of Nantwich, and died the 17th of January, 1627, aged 60, and had issue, Geoffrey, Edward, Margaret, and Ellen. Geoffrey [who erected the monument] married with Mary, daughter of Sir Edward Fitton, of Gawsworth, Baronet,—and had issue, then living, Edward, Richard, Thomas, Anne, Jane, Margaret, Mary, and Ellen. "Edward Minshull," continues Mr. Ormerod, "son of Geoffrey, and grandson of the purchaser of Stoke, was apparently the father of Elizabeth Minshull of Stoke, the third wife of Milton; and, if Dr. Williamson's assertion as to Edward Minshull, great grandson of the purchaser, being living in 1701 is correct, was buried at Nantwich, July 13, 1698, and his wife Ann, Aug. 2, 1694. These dates, however, probably refer to that great grandson,—as the Edward Minshull buried is called "Esq." in both entries, and the monument to the memory of Geoffrey Minshull, 1663, describes his eldest son as 'Edwardum Minshull, Militem.'" One would have thought that

the discovery of the knightly dignity of the person whom he had hit upon as apparently the father of Milton's widow would have induced Mr. Ormerod to doubt the accuracy of his supposition:—especially in the face of the authority of the early biographers, who speak of her as the "daughter of Mr. Minshal." He proceeds, however:—"The Villare of Nantwich Hundred, Harl. MSS. 2151 (written 1666) adds also after Stoke, 'St. Edw. Minshull d'nus'; and as this confirmation does away with the suspicion of a clerical error on the part of the copyist of the destroyed monument, there seems no reason to doubt the veracity of a monument erected most probably by the knight himself, though his dignity escaped the biographers of his immortal son-in-law." The unsupported statement, therefore, of Mr. Ormerod that this Edward Minshull "was apparently the father of Elizabeth Minshull"—for which no better reason is shown than that he was the head of the family of Minshull of Stoke at the period referred to—is, it is to be presumed, the only foundation for the revised statement which appears in the last edition of Todd's work, that Milton's third wife "was Elizabeth Minshull, of a gentle family in Cheshire: her father, Sir Edward Minshull, received the honour of knighthood." He adds, in a note, that "the above fact was communicated to him by the learned historian of Cheshire Mr. Ormerod."

Now, one of the documents in my possession is a bond, dated the 4th of June, 1680, from Richard Mynshull de Wisterson [doubtless Wistaston, which is near Nantwich,] in com. Cest., framework-knitter, to Elizabeth Milton, de civitate London, vid. It recites that Richard Mynshull, in consideration of 150*l*. paid or secured to be paid by Elizabeth Milton to him, (at the request and for the use of Elizabeth Milton) had surrendered unto Sir Thomas Wilbraham, Baronet, a messuage, with the appurtenances and diverse lands thereunto belonging, late in the occupation of George Henshaw, deceased, and then or late of the said Richard Mynshull or his under-tenants situate in Brindley, in the said county of Chester, for the term of the life of Mary Mynshull, wife of the said Richard Mynshull. To the intent to enable the said Sir Thomas Wilbraham to make a perfect lease of the premises unto the said Elizabeth Milton, for the term of ninety-nine years, if the said Elizabeth Milton, Mary Mynshull, Richard Mynshull, son of the said Richard and Mary, or any of them should so long live. The bond is in common form, being what the lawyers call a "bond for quiet enjoyment," by way of assurance of the title during the life of Mary Mynshull, the surviving life in the surrendered lease. It is sealed with the arms of Minshull—viz., an étoile issuant out of a crescent in base. That this was a family arrangement, and consequently that Richard Mynshull was a near relative of Mrs. Milton, is obvious. His description as a framework-knitter is inconsistent with the supposition of her being a daughter of the knightly family of Minshull, who were lords of Stoke as lately as 1701,—even if this supposition were not contradicted by the humble circumstances in which, as I purpose to show hereafter, Mrs. Milton lived during her widowhood. That the framework-knitter was connected, though perhaps in a remote degree, with the Minshulls of Stoke, is probable from his using the armorial bearings of the family; and that there were persons of that name (which is still a common one in the neighbourhood) who used the family arms, though moving in a somewhat humbler rank than the owners of Stoke, is evident from another monument in Nantwich Church, mentioned by Ormerod, on which the "arms of Minshull impaling Wilbraham" are found. The monument is to the memory of "Richard Minshull, son and heir of Mr. Thomas Minshull, of this Towne of Nantwich. He married Elizabeth, daughter of Richard Wilbraham, of Lincolnes Inn, Esq., son and heyre of Mr. Richard Wilbraham, of this Towne. * * * He dyed very piously upon the 17th day of February, 1637."

I hazard no conjecture as to who Elizabeth Minshull was: my object has been to show who she was not. I will not at present trespass further on your

* The Brindley estate passed by marriage with Grace, daughter of Sir Thomas Wilbraham, into the family of the Earl of Dysart. Might not a search among the papers of the family lead to some further information as to the Minshulls, in their character of Brindley leaseholders?—J. F. M.

columns; but will reserve for a future communication, if you would like to hear from me again, some particulars of the circumstances of Mrs. Milton during her widowhood, and of her pecuniary transactions with Milton's daughters. J. F. M. Warrington, 13th Sept.

OUR WEEKLY GOSSIP.

THE spreading influence of that Association of philosophers which has met for now nineteen years in the various towns of England under the title of the British Association, and the confidence in the usefulness of these meetings to the cause of Science, are evinced by the multiplied invitations which are addressed to it from localities the notabilities of which are severely desirous of having their own peculiar resources brought under its light, and of doing honour to the scientific chiefs of the world. From Hull, for example, the invitations for a meeting in that town were from the Mayor and Town Council, the Athenæum, the Mechanics' Institution, the Literary and Philosophical Society, the Corporation of the Trinity House, the Dock Company, the Hull and Selby Railway Company, the Kingston Cotton Mills, and the Hull Flax and Cotton Mills. There was a memorial to the same effect from the magistrates; and letters were received enforcing the invitation from Sir T. A. Clifford Constable, Bart., Richard Bethell, Esq., M.P., and Henry Broadley, Esq., M.P.—It was understood, also, that Lord Hotham and the Earl of Yarborough were anxious to support the prayer of these various applications.

The Sixth Anniversary of the Ray Society was held during the meeting of the British Association at Birmingham. From the report of the Council it appears that the Society keeps up the number of its members. During the past year this body published a fourth part of the great work of Alder and Hancock on the Nudibranchiate Mollusca, a volume of the Correspondence of Ray, and the first volume of a complete Zoological Bibliography, by Prof. Agassiz, assisted by Mr. H. E. Strickland.—For the present year a volume of Reports and Papers on Botany is already published, and two illustrated works are in a state of great forwardness:—the first, a Monograph on the British Entomostracous Crustacea, by Dr. Baird, of the British Museum;—the second, a Memoir on the British Freshwater Zoophytes, by Prof. Allman, of Dublin.

"The American Association for the Advancement of Science" has been holding its Second Annual Session at the town of Cambridge, Massachusetts,—and brought together a considerable gathering of philosophers. Among the papers read, one by Lieut. Davis, of the United States Navy, is mentioned, in which he purposes to establish "an American prime Meridian," to be substituted for that of Greenwich, now in use in America. To secure, however, an easy interchange with the present calculations, he proposes an arbitrary meridian at the city of New Orleans, to be exactly six hours in time and ninety degrees in space from the meridian at Greenwich.

The wish which we expressed some weeks ago that Government would at once, on its own responsibility, give orders to close all the grave-yards of London, within a radius of three miles of St. Paul's, is taken up, under the fearful pressure of the moment, by several of our contemporaries. But Government does not stir in the matter. Some grave-yards have been closed without its aid—fear in this case overcoming all minor considerations: and some most unseasonably squabbles are going on with a view to closing others in several of the parishes. In the face of the destroyer such altercations seem to us most painful and humiliating. Let the strong hand put them down. Let the executive use its power at once. Now, if ever, is the moment when unity of action is needed on the part of parish officials. There is no time now to waste in idle vestry meetings and petty efforts to assert laical independence. The common enemy demands all the resources of defence. A contemporary suggests that the Home Secretary should propose a bill, for the meeting of Parliament in February next, which shall confer on Government power to put an end to intramural burials next February:—to how many will such a proposal sound like a mockery? The relief that is wanted is—immediate relief. As a permanent settlement of the matter, we

* This is certainly a mistake. Her will, of which I have the Probate copy, is dated the 22nd of August 1727,—and was proved on the 16th of October in the same year, which fixes her death between those dates.—J. F. M.

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should desire to see a bill brought in next session: but something provisional must be done now. Government only can put an end to this great evil: and surely it can have no doubt of getting an indemnity for such an exercise of authority. If a cause were to arise, Government would suspend the Habeas Corpus Act "on its responsibility," should it hesitate in the case before us to close the grave-yards? "Vested interests" in the means of disease and death can hardly be held by an English Minister to be more sacred than life.

Letters have been received announcing the departure from Constantinople of Dr. Layard's Expedition to Nimroud. We believe that on this occasion a paid draughtsman is attached to the party:—although it will be difficult for any one to excel the truthfulness of Dr. Layard's own drawings of the remarkable monuments discovered by his energy and perseverance. Some account of the latest arrival of marbles from Nimroud will be found in our Fine-Art Gossip of this week.

We have before us a programme which announces the formation of an association of working men to aid in promoting the movement in favour of national secular education. Their address is written in a manly, earnest and sober spirit. The motto which they have adopted is, "Not charity, but justice."—it is the key-note to their appeal. They state the position in which they and their children find themselves with regard to the means of mental and social culture,—and ask whether the State is not, in reason, polity and law, bound to provide that they shall not remain in mental darkness? There is novelty in the last of these arguments. They contend that not only the constitution of the country, but the entire body of English law, is based on the assumption that every subject can read. All our law is written—even the common law; for that is founded on usages of which written memorials can be adduced. Every statute on the records addresses itself to a reader: and the executive power assumes that when once an Act is printed, enough is done to bring it within the reach and knowledge of every person who can be affected by it. This which is a legal fiction just now they desire to have made less so by creating a nation of readers.

From the New World we are informed that the gigantic project of Mr. Whitney for a railway across the American continent, from Lake Michigan to the Pacific Ocean, is advanced a step further towards the point of realization. The plan, we are told, has been submitted to the New York Chamber of Commerce, which body named a special committee to consider it and report upon its feasibility. The committee, it is said, approves of the project, and strongly recommends Congress to give it sanction. This is considered to be no longer doubtful. The newly-acquired possessions of the States on the Pacific seaboard require to be brought nearer to the centre of Government; and the trade of the Oregon and California would already find ample work for such a road. The reader will probably remember the outline of Mr. Whitney's scheme. He proposes that Congress shall make over to him in absolute proprietorship and for ever a strip of land—now waste or prairie—twenty-four miles in width, the whole length of the proposed line. In return, he will find capital to make the line, and will undertake to convey to any of the stations on his route all letters, stores, troops, and other Government matters, free of all charge for ever. There is something imposing in the terms of such a contract. The land to be ceded in the first instance is of little or no value to the State, its present owner; but it is supposed that a trunk line of railway joining the two hemispheres would soon give it importance. The speculator looks to the profit arising from the sale or rental of this strip of land to replace the enormous outlay required to construct more than a thousand miles of road through uninhabited country. When Mr. Whitney shall have completed his plan, the United States will become the highway from Europe to China—perhaps to Hindustan. It is a matter, therefore, of European as well as of American interest.

Some weeks since a paragraph in our "Gossip" reported the movements of Father Mathew in America. We then referred to his expressed desire to exchange his English pension for an Ame-

rican annuity, and to the efforts which were being made in his name to raise a fund for the purpose. Since that time, this begging-box policy has been still further developed by the prudent apostle. Of course, a man who comes hat in hand is not expected to be too free in speaking of the faults or shortcomings of those whom he solicits: and the reverend "seeker after a settlement," it seems, cannot afford to make enemies in a country where there are wealthy men willing to reward convenient missionaries. Some years ago an address was got up in Ireland to the Irishmen of America denouncing slavery, and urging them to throw their weight into the scale against its advocates. This address was signed by Father Mathew and seventy thousand others. The preacher of temperance had, we suppose, not thought of going to the United States at that time,—or of asking the dealers in flesh and blood for a pension. Times are changed—and he with them. Zachary Taylor has invited him to partake of the hospitalities of the White House,—leading men in the slave States have been coquetting with his subscription list; and the "apostle," who formerly denounced the abomination in good round terms, is now of opinion "that there is no prohibition of slavery in the Scriptures." Here, then, is another of those apostacies which so sorely try men's faith in the apostleship of Good. There were many who thought, when we did not, that the philanthropy of Father Mathew was not free from the suspicion of an unseemly connexion with worldly ideas,—but so open and complete a desertion to the religion of Mammon as this, we believe, no man was prepared to expect. When reminded of his former opinions, Father Mathew declared that they "brought upon him a good deal of odium." We wish success to his annuity hunting in America, only that England may have her bounty returned on her hands, as the apostle proposes. It is not our country at any rate which should pension in the name of Philanthropy a man who fears the "odium" of expressing an opinion adverse to slavery.

We perceive that Herr Stieglitz has recently died at Venice, of cholera. As one of the minor German men of letters his name would merit a record in our obituary:—but he is better known in England as the husband of that morbid, affectionate, ill-starred Charlotte Stieglitz of whom the strange story is told that, desiring to rouse him into life and activity when in a state of mental and physical lethargy, she conceived that nothing could be so efficacious as some fearful shock—and with this purpose committed suicide. This terrible expedient was not followed by any signal success. Since the death of his wife Herr Stieglitz seems to have produced no work worthy of regard. During later years, he had wandered into Italy,—and there espoused the cause of Italian Republicanism. His name will live in connexion with one of the most extreme developments of "ultra-Germanism" on record—if he record may be trusted in all its parts.

The men of Berlin gave a dinner to M. Humboldt, on the 14th instant in the Prussian capital, on the completion of his 80th year.

M. Guizot's new edition of his work on the English Revolution, for which, as we mentioned last week, he is writing an Introduction at Val Richer, will, we understand, be published in Paris and London simultaneously. The translation for England is in the very competent hands of Mrs. Austin.

The Yorkshire Antiquarian Club have recently had some field days on the Wolds. During the last week of August several members proceeded to Driffield in order to explore a large barrow near that town, supposed to be of Anglo-Saxon origin. This tumulus is in a field about half a mile on the railway towards Bridlington. It is circular in form, measures about seventy-three yards in circumference, and has long been known by the name of "Cheese-cake Hill." Various remains were discovered by the proprietor, Mr. Jennings, in levelling this mound a few years ago;—amongst them a spear, helmet, several earthen vessels, and numerous personal ornaments. These objects were presented by him to the Museum of the Yorkshire Philosophical Society. On Tuesday, the 28th of August, the members of the Club explored the remainder of the tumulus, and after some labour the skeleton of a female was exposed to view. It was laid on the right side, with the head to the north and

the face towards the west. Beside the body were discovered four circular fibulae, a buckle, several clasps, numerous beads of amber, cornelian, glass and clay, a comb,—and, it is said, a knife and scissors. On removing a further portion of soil the skeleton of a younger female became visible. It was lying with the head towards the south; its legs were crossed, and its position was so close to the skeleton first discovered that it was conjectured it might be the remains of the daughter of the former. Beside this smaller skeleton were found two fine cruciform brooches, together with several clasps and beads. On Wednesday the members proceeded to the "Danes' Graves," which are on the estate of Mr. Broadley, M.P., at the extremity of the lordship of Driffield, about three miles north of the town. In the absence of a direct report from the spot, we take the following notice of the day's work from the *Yorkshire Gazette* of the 8th instant.

The "Danes' Graves" were formerly much more numerous than at present; and at one time, when the Wolds were an uninclosed sheepwalk, they are said to have numbered upwards of 500; but the greater number has been levelled by the plough. The situation of these ancient monuments of the dead is singularly lonely and wild; they are on a skirt of rising ground, and enshrouded in an old wood of fantastically shaped trees. These barrows, from their great number, have long attracted considerable attention, and have been repeatedly explored. On opening them they have generally been found to contain a skeleton each, of large proportions and in a state of good preservation. On one occasion a small urn was turned up; but weapons of war, or other implements of metal, have seldom or ever been found. Five of these tumuli were opened by the deputation on Wednesday, and in each was found a skeleton, and in two of them fragments of an urn. On Tuesday last, a second examination was made. One of the tumuli, considerably larger than the others, and known by the name of the "King Barrow," was opened, but no remains of any kind were found. Tradition ascribes these memorials of the dead to the Danes, and they have from time immemorial been known as the "Danes' Graves." During the past week the excavations have been continued, and every day has brought to light one or more skeletons and other remains of a distant age. The principal articles discovered consist of three spear heads, a dagger, a Saxon knife, part of a pair of shears, rings, a quantity more beads, and other little things, having apparently been used in fastening apparel.

We trust some more detailed account will appear of the various objects discovered in the course of these investigations. There can be little doubt that the Yorkshire Wolds, if judiciously examined, will supply much new matter for archaeological discussion. We understand the next excursion of the Club will take place on the 24th instant, for the purpose of exploring the tumulus on Skipwith Common.

DIORAMA, REGENT'S PARK.—NOW EXHIBITING, the VALLEY of ROSENLAUI, Bernese Oberland, with the effects of a storm in the Alps; and the INTERIOR of the CHURCH of SANTA CRUCE, at FLORENCE, with all the gradations of Light and Shade, from Noonday to Midnight.—N.B. The Grand Machine Organ, by Gray and Davison, will perform in both Pictures. Open from Ten till Five.

THE MISSISSIPPI and MISSOURI RIVERS will soon close. Exhibited by Command to Her Majesty the Queen, H.R.H. Prince Albert, and Royal Family, at Windsor Castle. New Views, showing the Western Banks of the Mississippi, Towns, Villages, &c. to the City of New Orleans, being the largest picture ever executed by man. EXHIBITED at the EGYPTIAN HALL, Piccadilly, every Morning at Half-past Two; Evening at Half-past Seven.—Admission, Lower Seats, 2s.; Gallery, 1s.

THE NILE.—NOW OPEN, Afternoons at Three, Evenings at Eight o'clock, at the Egyptian Hall, Piccadilly, a new and splendid MOVING PANORAMA of the NILE, exhibiting the whole of the stupendous Works of Antiquity now remaining on its banks, between CAIRO, the capital of EGYPT, and the Second Cataract in NUBIA. Painted by Henry Warren, James Fahey, and Joseph Bonomi, from Studies by the latter, made during a residence of many years in Egypt.—Stalls, 3s.; Pit, 2s.; Gallery, 1s.—Will close for a month on Thursday next, the 27th instant.

Open Daily from Eleven to Five, and every Evening, EXCEPT SATURDAY, from Seven till Half-past Ten.

ROYAL POLYTECHNIC INSTITUTION.
DISSOLVING VIEWS OF ROME.
LECTURE AND EXPERIMENTS WITH THE HYDRO-ELECTRIC MACHINE.
LECTURES ON CHEMISTRY.
EXHIBITION OF THE OXY-HYDROGEN MICROSCOPE.
DIVER AND DIVING BELL.
THE CHROMATROPE.
EXPLANATION OF MODELS AND MACHINERY.
Admission, 1s.; Schools, Half-price.

A DREAM OF NOONTIDE.

A floating haze of sunshine wrapped each hill
Which compassed that Dream-valley all around,
Even as a vase with a gold rim is bound.
Nor was there any voice of bird or rill,—
But, like a "lotos-eater," Air lay still,
Drunk with the perfume from the flowers up-sent.
Divinest flowers! most rapturously blest,
As if they had been showered from Heaven, to fill
The valley with their wealth of stars and bells;

Like the rich bowls, all lined with flower-like gems,
Of which the wondrous Eastern story tells.
Far on the hill-slopes rose the slender stems,
Flowers of all poets, glorious Asphodels,—
Which, rarely seen our earthly flowers among,
Spread their deep roots wide o'er the land of Song.

Like unto streams rushing from hills of snow
To stir the lazy waters of a lake,
So did high floods of Amaranth odours make
Their headlong way between the hills, to flow
Into the lake of all sweet scents below.
—Long had I stood in keenest ecstasy,
Looking from sky to earth, from earth to sky,
Asking my languid mind if it did know
Whether this were the country of a dream,
Gathering the brightest flowers that round me grew,—
When, beautiful as Night's first star's first gleam,
I saw a little flower the sun shone through,
—And, with an impulse of swift love, let fall
My burden of gay flowers, to cull that least of all.

A.

FINE ARTS

EXHIBITION OF MANUFACTURES AND ART AT BIRMINGHAM.

It, with all the advantages derivable from studying the experiences of foreign nations in the organization of such matters, as well as the local and educational results of a series of preliminary attempts such as those made by the Society of Arts in London, the Highland Society in Scotland, the Dublin Society in Ireland, and many of the manufacturing towns throughout England,—and finally this, the most interesting and extensive of our collections exhibiting the results of industrial skill,—we cannot in 1851 contrive to produce a display unparalleled in the history of such institutions, we shall make an example of ourselves by no means to be desired before the world: but if, on the other hand, we are enabled “to hold” what we conceive to be “our own,” a vast amount of good will be done to all who are directly or indirectly connected with the interests of national production by the proposed Exhibition. As the Bishop of Oxford remarked in his speech the other day at the dinner of the British Association, “these are not days in which we can afford to concentrate upon words those energies which were given to us that we might rightly understand things;”—and if we would move onward in the very “vein and temper of the age,” there can be no doubt that we must enter heart and soul into the fullest appreciation of the material conditions which limit our existence as a civilized nation—as a producing and consuming people. It is because the lessons which these exhibitions of “things” convey are so eminently practical—because they give to us more positive ideas as to the form and nature of the labours and requirements of our fellow-men in one day than through “words” we might gain in many—that we enter warmly into the present effort of 1849, and the (let us hope) far greater one of 1851.

In analyzing this concentrated essence of Penny Magazine,—this vast supplementary volume of “Information for the People,” “got up” by the good town of Birmingham,—we have seen with great satisfaction what efforts the manufacturers of that locality have been making to convert the epithet “Brummagem” from a term of contempt into one demanding respect.

The building which contains this varied collection of objects is a temporary one, entirely constructed of wood. It forms a species of basilica with a nave, clerestory, and aisles,—about 128 feet in length and 90 in breadth. It is well adapted for its purpose; being well lighted and airy, and presenting an effective *coup d'œil*. In addition to this grand saloon, there is a long gallery (principally filled with models of agricultural implements and small specimens of machinery) connecting it with a large, old house standing at some little distance, every room in which is filled with machinery and its products. In the centre of the great hall stands one of those magnificent candelabra which almost realize the idea of the diamond trees from which hung all the precious jewels that so sorely tempted that friend of our youth, Aladdin. This evidence of skill and ingenuity—which measures 20 feet in height, and the form of which is as graceful as the material of which it is composed is faultless—surpasses all that Messrs. Osler have hitherto executed, and presents an ensemble as yet unrivalled in the history of manufacture.

Perhaps there is no other material in the form and conditions of which so vast and so rapid an improvement has taken place of late years as in that of Glass. When, from remembering the ponderous lumps of uncouth crystal that used to sparkle on the board of our fathers, we turn to the lovely forms and delicately cut ornaments that constitute the staple of the collections of Messrs. Richardson of Stourbridge, Messrs. Bacchus, Messrs. Rice & Harris, and Messrs. Osler, of Birmingham, we are tempted to believe that Murano in its palmiest days could not have supplied to the merchant-lords of Venice more beautiful goblets than are now placed within the reach of the ordinary “bourgeoisie” of this our “little isle.”

In the manufacture of Metals, too, we have been “going a-head” at no ordinary rate. The gorgeous paraphernalia of Romanish pomp which are exhibited as the joint productions of the taste of Mr. Pugin and of the industrial skill of Mr. Hardman, as contrasted with the vulgar *rococo* affairs of ten years ago, surprise us into admiration of the ability and perseverance which can in so short a time have wrought so extraordinary a change in the whole system of manufacture. Every mediæval handicraft seems again instinct with life under their auspices; and many of their productions rival in beauty of design and execution the loveliest specimens that enrich the Cathedral stores of Aix la Chapelle and Cologne.

In the execution of Bronzes—in which hitherto the French have stood “*facile princeps*”—Messrs. Elkington and Mason, strong in the possession of the electro-processes, seem prepared to “start a formidable opposition;” while their manufacture of plate and articles of *virtù* wants only a little more originality of thought and design to render it irrefragable.

In the old staple trades of Birmingham—button-making, brass-founding, gun-making, “toy”-making, &c.—every variety of production is here well represented; while in all the flourishing branches of commercial activity dependent on the railroad and mechanical system of the present day, the good town seems to be fully up to its work. It yet justifies the description which old Camden gave of it in the days of Queen Elizabeth:—“Birmingham full of inhabitants, and echoing with forges.”

Space for a detailed examination of the multitude of objects which here testify to the prosperous condition of our English manufactures we have not. We must content ourselves with congratulating all concerned in the formation of this interesting collection on the success which has attended their exertions for the public,—and reminding them, that if they would hope to shine in 1851, when their works shall be brought into contrast with all that is great in Continental manufacture, they must not relax in their efforts. They must endeavour to “snatch a grace beyond the reach of (their) art,” as it exists at present,—and transfuse into the somewhat torpid system of industrial design the invigorating blood of healthy and animated originality. To England, to Scotland, and to Wales, this administration of the stimulant of emulation should prove an important benefit:—how much, too, might it effect for Ireland! To parody one of her dealers in the Fine Arts, we would say:—

Let Erin remember the days of old,
Ere her lazy sons betrayed her,—
When her goldsmiths made their collars of gold
To sell to the Saxon trader.

FINE-ART GOSSIP.—During a few days past some of our daily and weekly contemporaries have announced that a ship has just arrived at Chatham laden with a further consignment of the Nimroud marbles, fruits of Dr. Layard's researches. The paragraph to which we allude is especially minute in its information. Thus, it is stated that orders have been given to the Customs department to pass the packages containing these valuable relics without delay, in order that they may arrive at the British Museum without previous handling by unskilful persons; and a hope is expressed that the said marbles will soon be exposed to public view. Now, we are enabled to inform those of our readers who may be interested in these remarkable monuments that no ship has very recently arrived at Chatham, or any other port, laden with such a precious freight,—inasmuch as the

last portion of the slabs was received, and housed, at the Museum on the 16th of August. Further consignments may be expected ere long. The colossal bulls are yet to come. They should have arrived some time ago: but it appears that the ship on the station was obliged to leave, owing to an outbreak of fever—having been previously delayed for want of the tackle necessary for shipping such great masses. This apparatus ought to have been supplied from the naval yard at Bombay,—and that it should not have been sent implies misapprehension of orders or mismanagement. A merchant vessel was employed to effect the transport of these mighty bulls, but the master of it was either unable or unwilling to undertake the task. It is said that he could not cut up his hatchways except at the risk of invalidating the assurance of his ship.—Having disposed of the paragraph in question, we may observe that the slabs lately received at the Museum are already accessible to the public; that they are chiefly from the North-western, or older palace, at Nimroud; and that most of them are figured in Dr. Layard's large drawings illustrative of his discoveries, published by Mr. Murray. Among so many objects, all of artistic and antiquarian importance, it is difficult to indicate those which are especially deserving of remark;—but of the slabs which will probably attract general attention, we may note one which represents an Arab, mounted on a camel, in rapid flight from a pursuing force. On another is shown the storming of a city; against the walls scaling ladders are fixed, and what is most curious—miners are working their way beneath the turrets. A third is carved with the deities at the sacred tree. There are two other slabs of great interest:—one representing the interior of a house, with various details of domestic economy—the other depicting soldiers swimming across a river or moat, to gain the shelter of a town, or castle, which is seen on the opposite bank. They are closely pursued by a hostile force. There is also a scene in a stable-yard, with a groom curry-combing a horse,—full of natural character. The same may be said of a group of camels:—though unfortunately the latter slab is much injured. Not the least curious object in this last arrival is the colossal head of one of the winged bulls, decorated with a crown of six horns and feathers.—The question of the exact antiquity of these surprising remains is in our opinion still open to discussion. The use of the *testudo*, or covered battering-ram, sometimes with wooden towers, like the “Helepolis” or “taker of cities” constructed by Demetrius Poliorcetes at the siege of Salamis,—of scaling-ladders and of mines,—in besieging fortified towns, would seem to indicate a later date than that assigned to these marbles,—or else it must be admitted, on the other hand, that these contrivances are of a more remote antiquity than has hitherto been supposed.

While on this subject, it gives us pleasure to state that Mr. Temple, Her Majesty's Minister at the court of Naples, has deposited in the Museum, for exhibition, a fine bronze figure of Bacchus,—which he purchased at Naples. The place where it was found is not known; but in style it bears a marked resemblance to the bronzes which have been discovered at Pompeii.—Among other late acquisitions in the department of Antiquities is a bronze head, supposed to represent the Emperor Hadrian, which was found some time ago in the Thames. It was purchased by the Trustees from the collection of a London antiquary for upwards of 100*l*.

A week or two since we were called on to notice the success of the School of Design established in the Potteries;—we have now great satisfaction in recording the steady progress of the Sheffield school under the able management of Mr. Mitchell. The manufacturers of the town have been gradually won over by his teaching to the cause. Such are the prospects of the institution that the Government grant has been increased from 250*l*. to 600*l*.—and Mr. Northcote, of the Board of Trade, stated at the annual meeting just held that he “had, in evidence, accorded the palm to the Sheffield amongst all the provincial schools.”

On the 1st of next month is to take place at Copenhagen the sale of a certain portion of the works and effects of the sculptor Thorvaldsen which we some time since announced to our readers. This portion, as they will remember, consists of duplicates

in the possession of the Copenhagen Museum of some of those works which the sculptor bequeathed to that institution, together with a collection of pictures, prints, medals, jewels, gold boxes, and modelling instruments directed to be sold by the great artist's will. Catalogues of the sale are now in London.

Mr. Herring the well-known animal painter appeared on Saturday last before the magistrate at Guildhall, and applied for his advice under—as the report phrases it—"rather peculiar circumstances." Mr. Herring has discovered that copies of his paintings have been sold as originals—or in other words that his name has been forged to spurious paintings. The complaint led to the natural inquiry on the part of the clerk "if the handwriting could be proved." Mr. Herring said it could not: and then went on to observe that he had remarked to a purchaser who had been taken in that "he always had his canvas from a house in Long Acre," whereas the canvas on which the forgery was painted "came from Rathbone Place in Oxford Street." This publication of the house where he obtains his canvas seems to us to have been highly injudicious on the part of Mr. Herring; and he may be sure that all future copies of his pictures will invariably carry the "hall-mark" of Long Acre.—There are other living artists, it appears by the report, who have to complain of similar frauds on their purses and reputations. Mr. Edwin Landseer and Mr. Clarkson Stanfield were named to the sitting magistrate as sufferers. But the evil is not of recent occurrence. A genuine Morland was seen in a pawnbroker's window by Morland himself in the midst of undoubted fabrications which imitated both his style and signature. We have ourselves in former years seen pictures by Patrick Nasmyth similarly copied:—and some of our artist friends could add to the list of impositions. Theodore Hook's story of a dealer who advertised "Titians once a week and Vandycks once a fortnight"—as if they arrived like eggs from Ostend and hams from Westphalia,—will occur to many. But as Jervas said, "poor little Tit how he would stare" could he see the pictures which pass with dealers—aye, and purchasers too—as the genuine productions of his master hand. But Mr. Herring has some redress. Though a signature to a deed on linen is not binding,—he may prosecute the vendor of a spurious "Herring" for obtaining money under false pretences.

MUSIC AND THE DRAMA

NOTES ON THE FESTIVALS.

At the third Concert of the Birmingham Festival the feature for all lovers of music was the 'First Walpurgis Night' of Mendelssohn. Unluckily it was played at so preposterously late an hour, that those who wished to listen were compelled to abstract themselves from an *obligato* accompaniment of departing company. This effected, the performance was most striking,—for the power and perfection of its choral and orchestral execution were worth a journey to Birmingham to hear; while the effect was sufficient at once and for ever to put out of court those who, like M. Fétis, characterize the genius of Mendelssohn as lying merely in nicety of detail. Anything lovelier than the Spring Chorus—more dramatic than the suppressed movement 'Disperse, disperse,'—and more frantically wild than the Witch revel—has never been heard on the opera stage. We repeat it (seeing that attacks are "in the town") that by few other composers, living or dead, could so large a variety of serviceable and attractive concert music, sacred and secular, be furnished as by Mendelssohn;—and the noble cantata in question wound up the three Concerts worthily.

On Friday the last performance of sacred music was given: commencing with a miscellaneous act. The gem of this was Madame Sontag's singing of the 'Bird Song,' from 'The Creation,' on which, though the music be not of the first class, we dwell with more than ordinary interest and pleasure, because not many months ago we were indicating how we imagined it ought to be executed, when discussing Mdlle. Lind's too plain and robust version of this delicate *bravura*. Madame Sontag's version seemed to us perfection. She leans to a greater moderation of tempo than is the taste of our day; but her execution is most delicate, her "changes" are

judicious and exquisitely finished, and the elasticity of her voice in this refined but showy music far outdoes the unmitigated *organ-stop* brilliancy of Mdlle. Lind.—Signor Costa's Offertorium, 'Date Sonitum,' was another interesting feature in the Concert;—so, also, was Mr. Chipp's performance of one of Mendelssohn's Organ Sonatas.—By way of close to the entire meeting came a large part of the 'Israel.' Among the *solo* selections, the duett 'The Lord is a man of war,' sung by Herr Pischek and Mr. Machin, must not be passed over; since the excellent Bohemian *basso* seemed more at his ease in that duett than in any other music sung by him at the Festival.—What can we say of the choruses that is new? The steadiness, force, and refinement with which they went, were the rule of this Festival. Nothing, indeed, short of such peerless brilliancy on the part of both composer and interpreters could have kept up interest drawn upon to the utmost by six grand performances in close succession.

It is not a new pleasure that we should commend Signor Costa on his successes,—but this Birmingham meeting is too signal an entry in their list not to be dwelt upon. Some score of years since he made his *début* in England at Birmingham, as the bearer of a weak Oratorio by Zingarelli, and as a singer but sparingly gifted by Nature. He has since won the conductorship over the best Opera in Europe,—he has brought the Philharmonic orchestra into a form and discipline which even great composers could not impress upon it,—he has revived the Sacred Harmonic Society when it was well nigh perishing of slovenly mal-administration,—he has, lastly, organized and perfected, during the busiest London season on record, the most generally admirable musical performances ever given in the provinces. If these services do not entitle Signor Costa to the warm gratitude and sincere respect of those who love the art in England, no less than of those who are gratified by the contemplation of progressive effort and improvement, we must have a new scale of appreciation. The Festival of which we now take leave is one of the *memorabilia* of our experiences of musical enjoyment. It will be long a standard and an object of emulation, both in London and in the country.

MARYLEBONE.—This theatre re-opened on Monday, with a tragedy by an American author (a Mr. Eps Sejeant, we believe,) founded on Corneille's 'Cid,' and entitled 'Velasco.' Neither story nor treatment was such as would have been ventured on, we think, by a modern English poet, unless he were a very young one, led back to an old subject in the course of his studies, and induced by enthusiasm and inexperience to attempt the revival of an exhausted interest. Castilian honour is brought into mortal collision with the passion of love. The father of the bride Isidora (Miss F. Vining) in bad humour strikes the father of the bridegroom, Velasco (Mr. Davenport). The latter, too feeble from age to resent the wrong, calls upon his son to become his substitute. Filial duty permits no denial:—the office is undertaken, and the offender is slain. With his last breath he binds his daughter by an oath to avenge him. Love and her monarch's commands ultimately, however, induce Isidora to forego the task; and she is about to marry the slayer of her father, when her brother, Julio (Mr. C. Wheatleigh), interposes, insisting on vengeance. Prompted by a wicked kinsman, Hernando (Mr. Johnstone), who hopes to become thereby the lady's husband, Julio prepares poison for his victim. From this peril Isidora saves Velasco;—who is, however, stabbed in the back by the determined avenger. Isidora herself drinks of the fatal cup,—and the curtain falls.

The early acts of the play are feebly written; but there is an occasional glimpse of poetic feeling which redeems the general commonplace. The last act becomes impressive from the force of the situations. Velasco is a character of chivalrous bearing and fine sentiment—a lover and a son "perplexed in the extreme." With Mr. Davenport the character has probably been a favourite in the United States:—certainly he performed it with a grace and energy which indicated a familiar acquaintance with its capabilities. Miss Vining was pleasing in Isidora,—but we can have no sympathy with a character so deficient in decision. The playwright has left all her love to be taken for granted,

too:—we have nowhere the development of the passion presented, and are therefore left to get what interest we can out of the mere incidents.

SADLER'S WELLS.—On Wednesday evening Shakespeare's 'Measure for Measure' was performed. The novelties in the cast were Mr. Dickinson as Claudio and Miss Glyn as Isabella. The former has the advantage of looking the juvenile delinquent to perfection. His pretty action and passionate delivery were well suited to the part. Miss Glyn threw much enthusiasm into the part of Isabella,—which is the most highly coloured of her personations. She was called for at the conclusion of the piece.

SURREY.—This theatre opened on Monday, under the direction of Mr. Creswick, for the legitimate drama,—with Mr. Sheridan Knowles's 'Rose of Arragon.' The hero, *Alonso*, was well supported by Mr. Creswick himself. Mr. Mead, an energetic performer of considerable promise, enacted the part of *Almagro*,—and Madame Ponisi that of *Olivia*. In other respects the play was ably supported.

MUSICAL AND DRAMATIC GOSSIP.—Our notes on the Liverpool and Birmingham Festivals, each of which possessed its special attraction, have precluded the necessity of our offering a report on the minor meeting at Hereford,—more especially since the excellence of its programme has been already commended in our columns. Generally, the year gives us occasion to remark advance in the selections for these meetings,—not borne out by any corresponding excellence in the *solo* singers. "Old frequenters," a tribe for the most part to be distrusted,—and this on the common ground of human infirmity (not because we assume ourselves to be wiser in our connoisseurship than they)—are not far wrong in asking where is now the Stephens, or Salmon, or Billington, or Braham, or Bartleman, who used to represent England worthily at such gatherings? Our best native singers are at best but second-rate: our most articulate native declaimers are exceeded in refinement and propriety of declamation by such artists as a Viardot—a Mario—and even a Castellan, who brings to her task the careful preparation of cleverness and industry. While orchestral and choral performance is making such strides, this "pasture of affairs" (as Mistress Winifred Jenkins spelt it) is a pasture very barren of harvest or of hope! In truth, of late years, gain has been too easy to the mediocrities. And this, conjointly with the depreciated taste of foreign audiences,—which has made the acquisition of foreign reputation very facile,—and with the increasingly versatile occupation now expected from the home vocalist, has tendered to lower the standard of excellence and finish. Our voices are excellent, but our conceit is large, and our style still to determine—so far as regards the Art of Singing.

The examination of Mr. Delafeld in the Court of Bankruptcy has "unearthed" all manner of facts regarding the Royal Italian Opera: from which the annual losses appear to have been heavy,—and the salaries enormous. The latter abuse must be amended if the former evil is to be remedied in the most prosperous theatre. Yet, in face of these discrepancies, managers never appear to be tired of speculating, nor artists of raising their terms,—that they may clamour before a Commissioner for arrears of salary! With some knowledge, however, of the manner in which these affairs become entangled and mystified—we ask (totally uninformed as to facts) to what extent the immense outlay on altering Covent Garden Theatre may have figured in the annual deficit; and we remind the public, that the accounts touching the current year produced in Basinghall Street, have no reference to the close of the season,—since Mr. Delafeld's failure took place early in July, contemporaneously with the production of 'Le Prophète.' The establishment has been since carried on as a commonwealth;—it is said, so satisfactorily that the same system is to be adopted in 1850. Out of all such contradictions as are involved in the above statements, grains of truth and of good counsel are to be elicited by those who seek: but if these are to prove medicinal and salutary, they must be swallowed and digested by the artists themselves—to whose indolence, exactions, and caprice, failure and unful-

filled promises in these undertakings may be largely ascribed.

Dr. S. S. Wesley has just received the appointment of organist to Winchester Cathedral, in place of Dr. Chard. We cannot mention the name of this distinguished player without again asking whether he, or some one else of those who possess the control over his father's compositions, will not, one day, afford musicians an opportunity of judging of their merits,—universally reputed to be great?

A correspondent announces to us that the fire which recently destroyed the Wesleyan Chapel at Armagh broke out in the organ; an instrument formerly built by Snetzler for the Cathedral, not long since purchased by the congregation in question, and opened, with some ceremony, only on the very evening when the conflagration took place.

Our contemporaries announce that Miss Hayes, Mr. Osborne, and Herr Ernst are about to turn "the recess" to account, by giving concerts in France.

The *Grand Opéra* of Paris re-opened its doors a few days ago. The management of the *Italian Theatre* there is said to have obtained the privilege of postponing the commencement of its season's campaign till the 1st of November.—The prayer for such a respite has a whimsical significance.

We have received the following from our Naples correspondent:—

London so monopolizes all musical talent that little is to be said of Naples. An important addition has been made to the vocal force of San Carlo in Signor Bassini. His voice is a brilliant barytone, and his style similar to that of Colletti. I am not certain if Bassini has ever appeared before a London audience:—if not, his time will come and his triumph will be sure. An Irish gentleman who has been since the spring in Naples, has likewise appeared successfully. This is Mr. Gustavus L. Geary of Christ Church and St. Patrick's Cathedral in Dublin. He possesses a tenor voice of great compass and sweetness, and has been studying here for some months under Signor Rossi, an eminent *maestro*. He made a successful debut at a concert recently given, by singing, amongst other *morceaux*, the grand scena from 'Ernani'.

The artist first mentioned above, we presume, is Signor de Bassini who appeared many years since in London,—and whose reputation in Italy has since been steadily rising. If we mistake not, some account of his singing at *La Scala*, in the 'Saul' of *Maestro Cannetti*, will be found in the *Athenæum* about four years ago.—In other towns of Italy, opera seems just now to be a less peaceful diversion than at Naples. A correspondent of the *Morning Chronicle* recounts a scene at Rome, in which a favourite *prima donna*, Signora Reboussini, became the innocent cause of an uproar, by first refusing a *bouquet* thrown to her by a French officer, and subsequently, under intimidation, wearing it, to the infinite disgust of her Italian *clientelle*. But alas for poor music in Music's renowned home! A letter from the north of Italy informs us of occurrences yet more tragical, into which the Art has been dragged. A performance has been recently given by the Austrians, at Milan, worthy of being commemorated: we mean the flagellation of some forty persons who joined in the demonstration against the festivities on the Emperor's birthday,—officially reported in the *Monitore*. Among the females, "who were not punished on the public place,—but privately" ("Put your worm on the hook," says Isaac Walton, "tenderly and as if you loved him") were two songstresses by profession. To such tragedies as this, however delicately graduated their shadings, too wide an audience cannot be summoned:—but what cannot be done by the Hangman may by the Journalist holding the lash.

MISCELLANEA

Balloon Passage of the Alps.—This remarkable feat has just been performed by M. Arban; who ascended from Marseilles at half-past six o'clock on the evening of the 2nd instant, and alighted near Turin at half-past two on the following morning:—having accomplished a distance of 400 miles in eight hours. He gives the following particulars of his voyage:—

I ascended from the Château de Fleurs on Sunday evening, the 2nd instant, at half-past six. At eight I was over the Wood of Esteret, where I ascertained I was at the height of 4,000 metres. The temperature of the air was cold, but dry; my centigrade thermometer marked four degrees below zero. The wind was south-west, and sent me over Nice. For nearly two hours surrounded by very dense clouds, my cloak no longer sufficed to keep me warm; I suffered much from cold feet. I nevertheless determined to proceed and to traverse the Alps, from which I knew I was not far distant. My provision of ballast was enough to raise me above

the highest peaks. The cold gradually increased, the wind became steady, and the moon lighted me like the sun.—*comme le soleil en plein jour*. I was at the foot of the Alps, the snows, cascades, rivers, all were sparkling; the ravines and rocks produced masses of darkness, which served as shadows to the gigantic picture. The wind now interrupted the regularity of my course. I was occasionally obliged to ascend, in order to pass over the peaks. I reached the summit of the Alps at eleven o'clock, and as the horizon became clear, and my course regular, I began to think of supping. I was at an elevation of 4,600 metres. It was indispensably necessary for me to pursue my journey and reach Piedmont. Chaoz only was under me, and to alight in these regions was impossible. After supper, I threw my empty bottle into the snow beneath, where possibly some adventurous traveller will one day find it, and be led to conclude that another before him had explored the same desert regions. At half-past one in the morning I was over Mount Miso, which I knew, having explored it in my first journey to Piedmont. There the Durance and the Po take their source. I reconnoitred the position, and discovered the magnificent plains of the mountain. Before this certainty, a singular optical delusion, occasioned by the shining of the moon upon the snow, was like to make me think myself over the open sea. But as the south-west wind had not ceased to blow, I was obliged by this fact, as well as by others I had noticed, that I could not be over the sea. The stars confirmed the accuracy of my compass, and the appearance of Mont Blanc satisfied me that I must be approaching Turin. Mont Blanc to my left, on a level with the spot in which I was, being far above the clouds, resembled an immense block of crystal sparkling with a thousand fires. At a quarter to three, Mount Viso, which was behind me, proved to be the mountain on which I was. I determined to alight, which I did without any difficulty, having ballast enough to go much further. I alighted near a large farm yard, where I was surrounded by several watch dogs, from whose caresses I was protected by my cloak. Their barking awakened the peasants, who were more surprised than frightened at seeing me. They admitted me to their house,—informed me that it was half-past two, and that I was in the village of Pion-Forte, near Subino, six kilometres from Turin.

Promotion in Sir John Franklin's Expedition.—The North Pole Expedition, under Sir John Franklin, had, on leaving England, five mates standing from 1841 to 1845, and two second masters standing 1842 and 1843: the claims of each party—the ships sailed early in 1845—for promotion may at least have been taken as equal. In April and May, two months after sailing, the five mates were promoted to be lieutenants of their respective ships, and, should they be fortunate enough to reach England, say early in 1850, will of course be promoted to commanders. The second masters have not been promoted, but will be, we may suppose, on their return; so that the mate will have gained 1,800*l.*, and his lieutenant's and commander's rank, and the second master 600*l.* and his master's rank. If they are not so fortunate as to reach England again the widows (if any) of the former get 70*l.* per annum, and of the latter *nil*.—*United Service Gazette*.

Archbishop Tenison's Library.—I have always felt that one important means towards the restoration of the Tenison Library is to procure donations of books,—and this I have kept steadily in view. Our funds do not allow of our making purchases. The interest which the Parliamentary Report has awakened, together with your notice, encourages me to hope that I may now be more successful. The Trustees have always gladly accepted donations,—and we have a Benefactors' Book, in which many worthy names may be found. A suggestion in your pages to those who have it in their power to help us would be very valuable, and I venture to solicit your aid.—By the way, I may correct you about the 'Chaucer.' We are not so fortunate as to possess an old copy. Our chief gem is a Saxon Prudentius.—I am, &c. PHILIP HALL.

Progress of Settlement in California.—The following cities were partly built or laid out in California:—Fremont, on the west bank of the Sacramento, opposite the mouth of Feather River; Vernon, situated on the east bank of Feather River; Boston, laid out on the north bank of Rio Americano; Sacramento City, laid out on the site of and embraces the celebrated Sutter's Fort; Sutter City, laid out on the east bank of the river Sacramento; Webster, laid out nine miles from Sacramento City; Sneezin, on the west bank of Sacramento; Tuolumne, laid out at the head of the Sacramento; Stanislaus, at the head of the river of the same name. Stockton, this thriving city is on a slough which contains the back waters formed by a junction of the Sacramento and San Joaquin rivers. Bonicia, this city, the intended rival of San Francisco for the commerce of the Pacific, is situated on the Straits of Karqueez; a navy yard and military storehouses are to be built there. Nassa, on Nassa Creek, forty miles from San Francisco; St. Lewis, laid out at the *embarcadero* on the Sonora Creek; San Rafael, laid out at the old mission of that name, on the north side of San Francisco Bay; and Sancelito, in San Francisco Bay, which has a good anchorage. Total, 15.

NINETEENTH MEETING OF THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

[From our own Correspondents.]

THE order of proceeding at the Nineteenth Meeting of the British Association has been the same as on former occasions,—with such varieties in the arrangements as the particular locality suggested. The summary of the proceedings is as follows.—On Wednesday the General Committee assembled,—as we last week recorded. On Thursday business began in all the Sections:—the Ethnological Sub-section of D forming the only exception. On that day the members of the Association visited the Botanical Gardens; and in the evening there was a Soirée at the Town Hall,—when the electric light was exhibited by means of Mr. Gassiot's powerful battery, and the subject was slightly explained by Prof. Faraday. There was also some good performance on the organ. On Friday the members of the Association, to the number of 450, dined together in the Town Hall.—the President taking the chair. On Saturday there was no business in any of the Sections; and the morning was occupied in excursions to Dudley,—to Kenilworth, Warwick and Leamington,—and to Wednesbury. The objects of the latter excursion were, to witness the process of manufacture of patent shafts, &c., and to visit some of the iron works and furnaces in the neighbourhood. Besides the hundreds of members of the Association who repaired to Dudley, thousands of the surrounding neighbourhood, being furnished with tickets of admission, reached the entrance to the galleries under the Castle Hill in barges, carriages, and on foot. The little army of both sexes began soon to pour into the cavern; and shortly after 10 o'clock Sir R. I. Murchison, accompanied by the French Ambassador, reached the scene of action where he had addressed the public ten years ago at a former Meeting of the Association. Lord Ward had directed his agent Mr. Smith to spare no expense in rendering the access to the galleries still more attractive than on the former occasion; and that gentleman had caused a foot road to be cut along the slope of the side of the gallery,—so that all the visitors who entered on foot saw the barges beneath them as in a River Styx: the interior vaulted cavities and the massive buttresses which support the roof being beautifully lighted. More than mid-way along the galleries on the western side of the hill, a dense mass being assembled in the lower part, Sir R. I. Murchison addressed them from a higher portion of the ground:—and making use of a speaking trumpet, was heard to the distant recesses of the cavern. He gave a popular sketch of the structure of the subterranean region of the Staffordshire coal-field and its relation to the upper Silurian rocks on which it rested and the lower red sandstone by which it was flanked and through which it had been elevated. Adverting to the underground researches of Mr. Blackwell and others and to a recent memoir of Mr. Jukes of the Government Survey, he then explained how the Rowley Hills of basaltic greenstone were the centre of all the eruptive agency of this tract. He particularly dwelt on the value to the miner of an acquaintance with organic remains; and explained how entirely the upper Silurian limestones were separated from carboniferous deposits, and how all over the world these ancient limestones, like this of Dudley, being once reached all hopes of finding coal vanished. He expatiated on the extension of his Silurian rocks (named and illustrated from the region of which the Staffordshire coal-field formed a part) over Europe, including Russia and Siberia and over America,—and concluded by proposing three cheers for Lord Ward who had lighted up the caverns for them, and the same for Mr. Smith, the miners and those who had carried out his Lordship's wishes. The company gave three to the Silurian geologist: and he thanking them, begged the French Ambassador to say a few words through the speaking trumpet,—which his Excellency did with much effect. Blue and red lights were then exhibited at the far recesses of the galleries, and the crowd began to defile by the upper road and to pass out. Those, however, who were late in coming, being subsequently addressed by Mr. Blackwell in the caverns after the great mass of persons had left them, were somewhat incommenced by the fumes result-

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ing from discharges of the gunpowder.—At 1 o'clock a great number of the party assembled on the summit of the adjacent hill of upper Silurian limestone called the Wren's Nest, where Sir R. I. Murchison gave them from this the highest spot in the county a general view of the relation of outline to his previous underground lecture.—The Bishop of Oxford proposed the thanks of the party to Sir R. I. Murchison; and in reference to the allusion which he had made to Carnateus or Caradoc, the famous British King of the Silures, proclaimed the geologist to be "The Silurian King."—Prof. ROGERS of Philadelphia being then called upon to explain the analogy between the Alleghany Mountains and the older rocks of England, made an eloquent address. The public museum of the Geological Society of Dudley was then visited, as well as the cabinets of Mr. Fletcher and Mr. Gray. Hospitality was offered on all sides; and the Priory and many houses in the town, were opened to the visitors. In the evening there was a *Soirée* at the Town Hall.—On Monday afternoon the General Committee held a meeting to decide on their next place of meeting;—and in the evening Prof. WILLIS delivered a lecture at the Town Hall 'On the Application of Science to Railways.'—On Tuesday Mr. CARTE made experiments with his rockets for saving life from shipwreck, at the Reservoir,—and in the evening there was a third *Soirée* at the Town Hall. The meetings of the Sections on the several days will be found in detail in our columns.—On Wednesday the General Committee assembled to sanction the grants which had passed the Recommendation Committee. In the afternoon of the same day the concluding General Meeting of the Association was held, for the accustomed ceremonial proceedings.

The Meeting has been decidedly a good one, and has been attended by the leading celebrities in the world of science. The more miscellaneous attendance of scientific men fell somewhat short of that of former years.

GENERAL COMMITTEE.

MONDAY.

The PRESIDENT in the chair.—Before proceeding to the ordinary business, Sir HENRY DE LA BECHE said there was a matter of pressing importance, requiring their first attention. A letter had been received from Col. Sabine announcing his resignation. He thought they would best show their appreciation of his services, by requesting him to continue them. Sir Henry then made a formal motion to that effect. It was seconded by Sir R. I. MURCHISON, and carried unanimously. Col. Sabine acceded to the wish of the Association.

Deputations were received from the following towns—Edinburgh (Prof. Forbes and others); Belfast (Profs. Stevelly and Hancock); Manchester (Mr. J. Heywood, M.P., and others); Hull (Mr. Pearsall); and Ipswich. These gentlemen having addressed the meeting,—

Sir R. I. MURCHISON moved that the next meeting should be held at Edinburgh. In doing this, he spoke warmly of the pressing invitation which the Association had received from Ipswich; and intimated his wish, that if the decision was to go to Edinburgh on the next occasion, it should be with the understanding that they went to Ipswich the ensuing year—viz. 1851.—The DEAN OF ELY, in seconding this motion, expressed his pleasure at the prospect of the Association visiting Edinburgh—a place in which resided some of the most distinguished men in the British Empire. The motion was carried unanimously.

Col. SABINE then proposed Sir David Brewster as President for the next year, which was seconded by Mr. L. Horner, and carried unanimously.

On the motion of the MARQUIS OF NORTHAMPTON, the following gentlemen were appointed Vice-Presidents for the next Meeting:—

The Earl of Cathcart, the Earl of Roseberry, the Right Hon. David Boyle, Lord Justice Clerk, the Lord Provost of Edinburgh (W. Johnstone, Esq.), Sir Thomas Brisbane, Bart., the Very Rev. Dr. Lee, Principal of the University of Edinburgh, J. Forbes, Esq., and W. P. Allison, Esq. Local Secretaries.—The Rev. P. Kelland, Dr. Baifour, and J. Tod, Esq. W. Brande, Esq., was appointed Local Treasurer. Mr. John Taylor was re-appointed General Treasurer, and Prof. Phillips Assistant Secretary.

Dr. DAUBENY then proposed and Mr. BABINGTON seconded a motion to the effect, that Prof. Royle

should be appointed Second General Secretary in conjunction with Col. Sabine.—Agreed to.

After a resolution to hold the next meeting in the first week in August, the business terminated.

The following were agreed to, as the Council for the ensuing year:—

Prof. Ansted, Sir H. De la Beche, Prof. J. Forbes, Prof. Graham, Mr. Grove, Mr. W. J. Hamilton, Mr. J. Heywood, Mr. L. Horner, Mr. R. Hutton, Mr. J. Gassiot, Col. Reid, Mr. Ronald, Capt. J. Robinson, Sir C. Lubbock, Sir C. Lyell, Sir C. Malcolm, Prof. Owen, Mr. G. R. Porter, Mr. W. Spence, Mr. J. Scott Russell, Mr. W. Hopkins, Col. Sykes, Prof. Wheatstone, Prof. Willis, Sir C. Lemon, and Sir P. Egerton; and *ex-officio* the President of the Association, and all who have held that office in former years; the Trustees, the Vice-President, the General Treasurer, the General and Assistant-General Secretaries.

WEDNESDAY.

The GENERAL COMMITTEE held their final meeting, —the PRESIDENT in the chair. The minutes of the last meeting were read and confirmed.

Sir R. I. MURCHISON moved and Col. SABINE seconded a motion to the effect that Lord Dunfermline's name be added to the list of Vice-Presidents.—Carried.

The PRESIDENT moved that the communication of Lord ROSSE 'On Nebulae' be printed entire amongst the Reports of the Association. The MARQUIS OF NORTHAMPTON seconded the motion,—which was carried.

The following recommendations then received the sanction of the Committee.—

Involving Grants of Money.

Sir J. F. W. HERSCHEL having reported that the Meteorological Observations made at Kew are peculiarly valuable, and likely to produce the most important results, the Committee recommend that the sum of 250*l.* be voted for the continuance of that establishment for the ensuing year.

That three standard barometers and other Meteorological Instruments be sent out to the British Consul-General at the Azore Islands, with the view of encouraging that gentleman (Mr. C. Hunt) to pursue his Meteorological Observations at the several Islands at which he has British Vice-Consuls;—and that Col. Reid, Col. Sabine, Sir W. S. Harris, and Prof. Phillips be a Committee for carrying out the above objects, with the sum of 25*l.* at their disposal for the purpose.

Dr. Percy and Prof. Miller, to continue Researches on Crystalline Slugs, &c.

Dr. Schueck, to continue Investigations on Colouring Matters, &c.

Dr. Smith (Manchester), to continue Investigations on the Air and Water of Towns, &c.

R. Mallet, Esq., Rev. Dr. Robinson, and Prof. Oldham, to Determine by Instruments the Elements of the Transit of Natural and Artificial Earthquake Waves, &c.

Dr. Lankester, Prof. Owen, and Mr. R. Taylor, on Periodical Phenomena of Animals and Vegetables, &c.

Mr. Strickland, Dr. Daubeny, Prof. Lindley, Prof. Henslow, on Vitality of Seeds, &c.

Prof. E. Forbes and a Committee, to procure a Report on British Annelida, &c.

Not Involving Grants of Money or Application to Government.

Prof. Powell's Communication on Meteors to be printed among the Reports, and to be continued from time to time.

That the President of each Section, with two other Members to be named by him (and the General and Assistant-General Secretary *ex-officio*), be a Committee for the purpose of revising the Recommendations which have from time to time been sanctioned by the Association, and for reporting to the Council the steps which, in their opinion, should now be taken to give them the effect which Science requires.

That the Council be authorized to institute such steps as appear requisite to carry out this object.

That Meteorologists should be invited to communicate as they occur, to the Association, through the Assistant-General Secretary, any Abnormal or other Meteorological Phenomena of interest, observed by them.

That a Committee, consisting of Lord Adare, Dr. Robinson, Prof. Forbes, Col. Sabine, Col. Reid, Prof. Powell, Sir J. W. Lubbock, Mr. Birt, Mr. A. Smith, Mr. J. A. Brown, and Prof. Phillips, with power to add to their number, be appointed to consider the best mode of promoting the observation of Luminous Meteors and Auroras; and that observers be requested to communicate with Prof. Powell on Meteors, and with Prof. Phillips on Auroras.

That a Committee, composed of Sir H. T. De la Beche, Sir W. Hooker, Dr. Daubeny, Mr. Henfrey, and Mr. Hunt, be requested to continue their investigations on the action of Carbonic Acid on the growth of Ferns.

That Mr. R. Hunt be requested to furnish to the next Meeting a Report on the present state of our knowledge of the Chemical Action of the Solar Radiations.

That Mr. Mallet be requested to complete his Report on the Static and Dynamical Effects of Earthquakes.

That Prof. E. Forbes, Dr. Playfair, and Dr. Carpenter be requested to report on the Perforating Apparatus of Mollusca. That the subject of Luminosity in Living Animals be recommended to the attention of naturalists; and that Mr. Darwin be requested to collect and receive observations on the subject.

That Mr. Henfrey be requested to report on the Hybridism of Plants.

That Mr. G. R. Porter, Col. Sykes, Mr. Tooko, Prof. Longfield, Mr. Lawson, and Prof. Hancock be requested to prepare a Report on the State and Progress of Statistics; and that Dr. Playfair be requested to co-operate with them.

Involving Applications to Government.

That an Application be made to Her Majesty's Government to establish a Reflector, not less than three feet in diameter, at the Observatory at the Cape of Good Hope, and to make such additions to the staff of the Observatory as may be necessary for its effectual working; and that the President be requested to communicate with Lord Rose, Sir J. Herschel, the Astronomer Royal, Sir T. Brisbane, and Dr. Lloyd on the subject, and to obtain the concurrence in the application of the Royal and Astronomical Societies, the Royal Society of Edinburgh, and the Royal Irish Academy.

That an Application be made to the Master-General of the Ordnance to have the Levels of the Ordnance Survey of Ireland corrected to the Mean Sea Level, as deduced by Mr. Airy from the Tide Observations round that Island; and that the President, Trustees and Officers of the British Association and the Presidents of the Royal and Geological Societies and the Royal Irish Academy be requested to make this application.

That Application be made to the Master-General of the Ordnance to have the British Arc of the Meridian published in its full extent, and that the President, Trustees, and Officers of the British Association, Royal Societies of London and Edinburgh, the Royal Irish Academy, and the Royal Astronomical Society be requested to make such application.

That the Members of the British Association who are also Members of the Legislature be requested to act as a permanent Committee, to watch over the interests of science; and to inspect the various measures from time to time introduced into Parliament likely to affect such interests; and that the Marquis of Northampton, Lord Rose, Lord Wrottesley, Lord Adare, M.P., Sir Philip Egerton, M.P., and Sir C. Lemon, M.P., be requested to organize such Committee. Adjourned.

The final general meeting was held in the Town Hall on Wednesday afternoon. The formal business having been gone through, the PRESIDENT proposed the customary votes of thanks to the governing bodies of the town and to the local officers. LORD WROTTESLEY and the MAYOR acknowledged the compliment. Sir R. I. MURCHISON moved and Dr. BUCKLAND seconded a vote of thanks to Dr. Robinson, which was acknowledged,—and the meeting adjourned.

The total number of persons attending this meeting has been 1123;—the receipts, 951*l.* 5*s.* 9*d.*

SECTION A.—MATHEMATICAL AND PHYSICAL SCIENCE.

'On an Atmospheric Phenomenon seen in Switzerland,' by Sir R. H. INGLIS.—This communication was made at the time the phenomenon was witnessed, by letter to Col. Sabine:—"Aug. 8, 1849.—We were at Gais (Canton Appenzel, Switzerland) a few days ago, and saw there what may be familiar to you and other men of science, but was quite new to me and to the people of the place. About 3 P.M., on the 8th of August, my servant called to me "that there was something falling, very curious." I went out to the bridge which connects the old and new buildings of the Hôtel du Beuf—and, under the shade of the new house, looked up and saw thousands and thousands of brilliant white motes, like snow, falling in flakes. There were no clouds, but there was a kind of halo round the sun,—or rather, as I looked up, there were in that direction apparently more and larger masses, through which the rays passed; balls separated themselves, consisting of vast numbers; and these resolved themselves into fragments, and came whirling and floating about. The master of the hotel, M. Heen, joined us; he had obviously never seen anything of the kind before, and called out "Des millions, des millions." He summoned his people to look. I continued to gaze, till I was half blinded. At first, the fragments seemed to melt; and to the last I could distinguish no appearance of an animal. Our servant fancied that he saw something like wings. I certainly looked till, to my eye, they seemed to evaporate, but their disappearance, and perhaps the reappearance of the same individual, might have been owing to their turning at right angles, instead of exhibiting their extent lengthways, and *vice versa*. This lasted—at least, I looked—twenty-five minutes. Certainly none came to the ground. Réaumur, 20°; no wind. Gais is 3,100*ft.* above the sea."

Sir R. INGLIS then read extracts from a letter from Sir J. Herschel, containing some notices of similar phenomena:—"Of analogous facts (more or less so) I can mention two: 1. In or about the year 1821, I remember seeing in Sir J. South's telescope, at Blackman Street, when turned in a direction near but not to the sun, about mid-day, frequent objects, having all the appearance of stars, which were seen sailing through the field of the telescope. Dr. Wol-

laston, when this was mentioned to him, said it was thistledown; I do not think it was. 2. In the hay season, some three or four years ago, the day being clear and hot and calm (at least in the immediate neighbourhood of our house), our attention was excited by what at first seemed to be strange-looking birds flying, but though presently assured they were not birds, it was by no means clear what they were. They were irregular wispy masses, sailing leisurely up and settling down again, apparently over a hay-field on the east of our grounds, and about a quarter or three-eighths of a mile from our house. Some of these were of considerable size, and their general appearance was convex downwards and taily upwards. After wondering awhile, I got a telescope and directed it to the flying phenomenon, when it became evident that they were masses of hay, some of very considerable size, certainly not less (allowing for the distance) than a yard or two in diameter. They sailed about leisurely, and were very numerous. No doubt wind prevailed at the spot, but there was no roaring noise nor any sign of a whirlwind, and all about us was quite calm. Nobody was at the time at work in that field. None fell on our side of the trees, above which they rose perhaps 50 or 100 feet.—P.S. Could Sir R. Inglis's phenomenon have been winged ants? They sometimes appear in astonishing numbers, and might associate like gnats in masses for a dance and separate again.—Sir R. Inglis added that he had set down this communication as an "atmospheric phenomenon" rather for the purpose of giving it a title than as intending to express a fact, his own private conviction being that they were some kind of insect.

Col. SABINE stated that Humboldt had recorded several instances when in the Caraccas, of hay, straw, sand, and even larger objects, being carried up bodily into the air, whirled about, and scattered in it, rising on the one side of the mountain, carried over it, and again descending on the opposite side, with the descending atmospheric column which had raised them. Instances also were recorded of large masses of ice, which, from the great elevation at which they were, seemed to float about, and produce interesting appearances.—Dr. ROBINSON mentioned one instance in which the fall of a mass of ice of about 15 ft. across was recorded as having occurred. He also stated that he had sometimes found that the wings of rooks, as they turned round in the sunbeams under favourable circumstances, reflected so strong a beam of light as to penetrate the shade used to protect the eye when looking at the sun. This appearance, when it first occurred to himself, gave him much trouble to account for, and he now mentioned it to apprise those of the fact who might mistake this appearance for meteors crossing the sun, or even for something taking place on its surface.—Sir D. BREWSTER mentioned several instances of large objects carried up into the air in Scotland, as also of masses of ice which had fallen of unusual magnitude.—Prof. STEVENS said that, besides the recent instances recorded by modern travellers of pillars of sand raised into the air in the deserts, Ulloa, in his account of the voyage of the associate French and Spanish philosophers to measure a degree near the equator, had recorded as of regular daily occurrence the moving of numerous and vast pillars of sand and other debris across the extensive plains which were met with at a considerable elevation among the Andes.—Dr. ROBINSON said that this subject had a bearing not very remote on anemometrical researches; and that the common idea that wind consisted of one steady current of air in one fixed direction required to be considerably modified, as from facts observed by him, when endeavouring to determine the velocity of the wind by firing gunpowder, he found that the direction was frequently wavering back and forwards, and even ascending filaments and currents frequently encountered.

'On an Extraordinary State of the Weather in India during the latter half of February last,' by Sir C. MALCOLM.—(Extract from the *Bombay Times*, March 3/16, 1849).—"We have letters from Hoshungabad to the 6th inst., which mention that most extraordinary weather had prevailed there during the latter half of February. It had been close, hazy, and dry, and a similar state of matters prevailed up to the day above mentioned. On the evening of the 5th the clouds began to collect, the atmosphere

having been highly charged with electricity for four days previous,—the electrometer (Cavallo's) readily indicating the amount, and the least friction causing considerable excitation. Pressure and dryness had somewhat increased, and rain was therefore not looked for, but either another earthquake or a thunder-and-dust storm was predicted by the weather-wise. On the 20th of February, half a gale had blown throughout the greater part of the day, the mean of the barometer having descended in three days from 29.949 to 29.684! Our correspondent continues:—"Prognosticating an earthquake at Hoshungabad is somewhat akin to a pig seeing the wind, but I only hint at such a phenomenon from the consciousness that there is something very peculiar just now in the atmosphere, and from the fact that the instruments seem as strangely affected as the senses." We adverted in a former issue to the singular state of the weather at Calcutta, Delhi, along the line of the Jhelum and Chenuab, from Rhotas to Mooltan, and near Socotra, at Aden, on the 22nd of January, and we now have an account of the appearance at Gibraltar, at the same date, of nearly the same phenomena, which were observed all over the northern part of India. Here, as at Calcutta, Bombay, and Aden, the mercury was remarkable for its elevation; and we have little doubt that were returns obtained from the intermediate points, similar facts would be supplied. Here we have one of the most striking cases of an atmospherical perturbation of simultaneous occurrence we have ever noticed, traceable over one-fourth part of the earth's circumference from east to west, and 20° lat. north by south. We now have the same striking chain of phenomena from Ceylon, where the heat at Colombo in the last week of January was altogether without precedent in the meteorological annals of the cinnamon isle. Hot winds resembling those of the present year were last experienced in 1844 (month not given), when they blew from the 16th to the 19th, occasioning much injury to the crops. The waters of the Colombo Lake were beginning to dry up and the canals were nearly useless. Many of the wells had run dry. The *Ceylon Times*, to whom we are indebted for these facts, assures us that the evaporation amounts to nearly an inch per diem."

Mr. BLUNT exhibited a model in plaster of part of the moon's surface.

Sir D. BREWSTER observed, this model is an accurate representation of the moon's surface as it appears through a Newtonian telescope of 7 ft. focus and 9 in. aperture, under a magnifying power of about 250. The large volcanic crater which forms the principal object in the model, has received the name of Eratosthenes. It is about 30 miles in diameter and stands at the end of a lofty range of mountains not far from the centre of the moon's disc. A hilly district, rising into two or three lofty peaks, runs upwards from Eratosthenes, connecting it with what appears to have been an ancient crater now filled up. Touching the edge of this crater and descending from it towards the right may be seen a long line of minute volcanic cups, which are nearly the smallest objects visible with the instrument by which the observations were made. The whole is represented as seen with an inverting eyepiece, and the model ought to be held in an oblique light, in order to view it to advantage.—Dr. ROBINSON mentioned that Lord Rosse had modelled this crater with the 3 ft. reflector, power 800,—of course on a much larger scale; but he bore witness to the beautiful and correct representation which the model presented. In particular, he directed the attention of the Section to the interior terrace, and showed its analogy to what is exhibited in some of our own volcanoes when the lava fills the crater till its sides yield to the pressure, and then escapes, leaving a level terrace round its sides. He hoped Mr. Blunt would extend his labours and give as many of these craters as might be in his power.

'An Account of a new Stereoscope,' by Sir D. BREWSTER.—This modification of Prof. Wheatstone's instrument is a portable little instrument, which can be held up to the eyes like a double opera-glass. By looking through the edges of two lenses, the distances of which admit of being adjusted, you obtain a single impression of two pictures drawn on paper or cards, as seen separately by each eye; the entire figure taking the full relief of the natural

object of three dimensions, from which the pictures had been drawn. This instrument, its construction and adjustments are described in Vol. iii. of the *Transactions of the Scottish Society of Arts*.

'Description of a Binoocular Camera,' by Sir D. BREWSTER.—This instrument affords to artists a ready mode of obtaining drawings of full-length both of colossal statues and of living bodies or fixed structures,—which pictures can then be exhibited as solids by the stereoscope. As the camera required for this purpose must have two lenses of exactly the same focal length, in order to form by the Daguerrotype or Talbotype processes the two pictures required with mathematical precision, Sir David has constructed this double camera by dividing a suitable lens into two semi-circular lenses,—each of which will form an image exactly like that which the entire lens had formed, though with less light. These semi-lenses, placed at the proper distances from each other and from the object, give the two pictures as required for producing the effect of relief when seen by each eye at once in a stereoscope.

'On a New Form of Lenses, and their Application to the Construction of two Telescopes or Microscopes of exactly equal Optical Power,' by Sir D. BREWSTER.—This method is to divide, in the same way as before described, one lens into two semi-lenses, and using each semi-lens for forming the image. Sir David also showed, that by a proper adjustment of two such lenses in a frame, by placing their diameters at a proper angle, each may be made to correct the imperfect image formed by the other.

'On a Mode of Measuring and Correcting the Astigmatism of a Defective Eye,' by Mr. G. G. STOKES.—Besides the common defects of long sight and short sight, there exists a defect, not very uncommon, which consists in the eyes refracting the rays of light with different power in different planes,—so that the eye, regarded as an optical instrument, is not symmetrical about its axis. This defect was first noticed by the present Astronomer Royal, in a paper published about twenty years ago, in the *Transactions of the Cambridge Philosophical Society*. It may be detected by making a small pin-hole in a card, which is to be moved from close to the eye to arm's length, the eye meanwhile being directed to the sky, or any bright object of sufficient size. With ordinary eyes, the indistinct image of the hole remains circular at all distances; but to an eye having this peculiar defect, it becomes elongated,—and when the card is at a certain distance, passes into a straight line. On further examining the card, the image becomes elongated in a perpendicular direction; and, finally, if the eye be not too long-sighted, passes into a straight line perpendicular to the former. Mr. Airy has corrected the defect in his own case by means of a spherico-cylindrical lens, in which the required curvature of the cylindrical surface was calculated by means of the distances of the card from the eye when the two focal lines were formed. Others, however, have found a difficulty in preventing the eye from altering its state of adaptation during the measurement of the distances. The author has constructed an instrument for determining the nature of the required lens, which he described.

'On a New Equatorial Mounting for Telescopes,' by the Rev. Prof. POWELL.—The object of the plan here proposed is mainly the personal convenience of the observer, and the ease and rapidity of changing to a new position.

'On De Vico's Comet,' by the Rev. Prof. POWELL.—In the absence, as yet, of any published notice or calculated results relative to the expected return of De Vico's Comet in the ensuing winter (by which its periodicity is for the first time to be verified), the author submitted the results of a rough graphic projection according to the elements adopted by Sir J. Herschel ('Outlines,' p. 652). An accompanying sketch gave the main features of the orbit since its last perihelion passage (Sept. 2, 1844). The comet twice passed a little above the orbit of Jupiter, being at aphelion about June 1847, somewhat beyond that orbit. Jupiter, however, was at that time more than a quadrant distant. It passed near the orbit of Mars in Nov. 1844; but that planet was also distant. It may, however, have been perturbed by some of the asteroids whose paths it crossed March 1845 and Aug. 1849. If undisturbed, its perihelion passage will take place Feb. 16, 1850, 13h 45m.—

which time the Earth will be nearly at the opposite point of its orbit. The distances of the comet from the Earth through all this portion of its orbit will be very little. At its last perihelion the Earth was very favourably situated for seeing the comet, — being at about $\frac{1}{3}$ of the diameter of the Earth's orbit from it. Yet it then appeared small and faint. At the ensuing perihelion it will be at a distance of $\frac{1}{3}$ nearly; and may probably, therefore, be totally invisible. If it should be visible, it may be seen in November, about two hours behind the Sun, and not far below the ecliptic, — to which its orbit is inclined only $2^{\circ} 54'$. It passes its descending node in Sept. 1849, and its ascending in June 1850.

'On the Friction of Water,' by R. RAWSON, Esq. — The object of this paper is to ascertain the friction of water on a vessel or other floating bodies, rolling in water. For this purpose, experiments have been made upon a cylindrical model—whose length is 30 inches, diameter 26 inches, and weight 255.43 lb. avoirdupois—in the following manner:—The cylinder was placed in a cistern, in the first place, without water, and made to vibrate on knife-edges passing through the axis of the cylinder. A pencil projecting from the model in the direction of the axis of the cylinder on the surface of another moveable cylinder marked out upon paper placed upon this last cylinder the amplitude of each oscillation. The cylinder was deflected over to various angles by means of a weight attached by a string to the arm of a lever fixed to the cylindrical model.—

Angle of Deflection.	Angle to which the Model vibrated.
$22^{\circ} 30'$	$22^{\circ} 24'$
$22^{\circ} 10'$	$22^{\circ} 6'$
$21^{\circ} 54'$	$21^{\circ} 48'$
$21^{\circ} 36'$	$21^{\circ} 30'$
&c.	&c.

When the cylinder oscillated, in all circumstances the same as above, except being surrounded by salt water, the amplitude of oscillations was as follows.—

Angle of Deflection.	Angle to which the Model vibrated.
$22^{\circ} 30'$	$22^{\circ} 0'$
$21^{\circ} 36'$	$21^{\circ} 3'$
$20^{\circ} 48'$	$20^{\circ} 16'$
&c.	&c.

Clearly showing that the amplitude of vibration when oscillating in water is considerably less than when oscillating without water. In the above instance there is a falling off in the angle of amplitude of $24'$, or nearly half of a degree. This amount has been confirmed by several experiments made with great care; and it appears only fair to attribute this decrease in the amplitude of oscillation to the circumstance of the friction of the water on the surface of the cylinder. The amount of force acting on the surface of the cylinder necessary to cause the decrease in the amplitude of oscillation shown by the experiment was calculated; and the author thinks that this amount of force is not equally distributed on the surface of the cylinder. In consequence of this, he thought the amount on any particular part might vary as the depth. On this supposition, a constant pressure at a unit of depth is assumed. This, multiplied by the depth of any other point of the cylinder immersed in the water, will give the pressure at that point. These forces or moments being summed by integration and equated with the sum of the moments given by the experiments, we shall have the following value of the constant pressure at a unit of depth:—.0000469. This constant in another experiment, the weight of the model being 197 lb. avoirdupois, and consequently the part immersed in the water was very different from the other experiment, was—.0000452, which differs very little from the former, — showing that the hypothesis assumed in the computation is not far from the truth.

'On the Oscillations of Floating Bodies,' by R. RAWSON, Esq.—This paper had for its object the description of a course of experiments made at Portsmouth Dockyard by Mr. John Fincham, the master shipwright, and the author, with a view to confirm several important formulæ discovered by Prof. Moseley relative to the rolling and pitching motion of vessels. All the experiments, which were made by Admiralty order, confirm the formulæ for determining the amount of force or work done to deflect a floating body in a state of equilibrium through a given angle, and also another formula which determines whether the vessel thus deflected

will move slowly or otherwise. The importance of these questions to naval architecture is obvious; and all the experiments we have made show what we believe to be an important practical fact,—viz. that when a sudden gust of wind is applied to the sails of a vessel, or any cause which acts constantly during one oscillation, the ultimate amplitude of deflection will be double the amplitude which the gust of wind will permanently deflect the vessel. In the next part, several experiments were made on models of vessels,—some of which have been built with a view to ascertain the best form of midship section which will give the easiest rolling motion.

'On Mirage on the Sea Coast of Lancashire,' by T. HOPKINS, Esq.—In this paper Mr. Hopkins represented that he had observed the phenomenon called mirage on certain parts of the sea-coast of Lancashire, and had at different times examined the state of the atmosphere in various parts of the shore; but more particularly near Southport. Here he found that whilst the sky was cloudy, apparently threatening rain, evaporation in the air, near the surface of the wet shore, was very active. But at other times, when the sun was shining brightly, evaporation at the same short distance from the surface was checked, or entirely stopped; and at such times mirage might be seen. On the morning of July 9th, mirage appeared at a certain distance to the north of the spectator, over the flat sandy shore; and on examining the state of the locality where the phenomenon had been seen, the following facts were ascertained.—

The temperature on the adjoining dry sand-hills was.	67°
— on the moist sand of the flat shore	$72^{\circ} 1'$
— of a dry bulb thermometer in air.	$65^{\circ} 5'$
— of a wet bulb ditto ditto	$63^{\circ} 6'$

Difference between the two last $1^{\circ} 9'$

To account for these facts, Mr. Hopkins said that when mirage appeared, the sun was shining brightly, and by his direct rays raised the temperature of the ground considerably, when energetic evaporation from the wet sandy shore took place, which sent much vapour into the atmosphere. The presence of this vapour in the air checked evaporation from the wet bulb thermometer, and prevented it from becoming much cooled; and the wet bulb thermometer at the same time, by the feebleness of its evaporation, proved the existence of the large amount of vapour in the locality. Now, as mirage appeared only when the sun produced a large amount of vapour from the moist surface of the ground, which vapour was shown to be present by the state of the wet bulb thermometer, it is to be inferred that the vapour caused the appearance of mirage. It might be that some of the vapour was condensed by the comparatively cool air at a small distance from the surface of the sand, and thus a stratum of cloud was formed, from the surface of which light was reflected. But, however this may be, the presence of vapour sufficient to saturate, or nearly saturate, the air in the port always accompanied the appearance of the mirage,—and therefore is presumed to be the cause of it. Objects seen reflected in the mirage were occasionally intensely blue. Objects that were beyond the place where the mirage appeared were reflected by it as if they were reflected by water. Refraction sometimes accompanies mirage,—distorting the reflected as well as other objects nearer to the spectator than the mirage; but the refraction is quite a separate phenomenon,—sometimes appearing with, and sometimes without, the mirage. Mr. Hopkins exhibited a number of tabulated observations in corroboration of what had been advanced. He also said, that recently, at Blackpool, in the middle of the day, with a clear sky and a strong sun, while the dry and wet bulb thermometers on the wet sandy shore were at the same height (70°), there was a difference of 5° between the two instruments on the adjoining cliffs, about sixteen yards high. These facts, Mr. Hopkins contended, proved that while evaporation saturated the air near the surface, and produced mirage, the atmosphere at the height named was comparatively dry,—allowing evaporation to take place with considerable energy from the wet bulb thermometer.

'On the Means of Computing the Quantity of Vapour contained in a Vertical Column of the Atmosphere,' by T. HOPKINS, Esq.—Mr. Hopkins showed that the quantity of aqueous vapour existing

in the atmosphere is computed, by meteorologists of the present day, from the tension of vapour near the surface of the globe in such a way as would alone be correct if an atmosphere of vapour only existed. But the vapour in our atmosphere is intermixed with, and diffused through, gases,—which gases cool by expansion, consequent on the removal of incumbent pressure, five times as much as the vapour does. The vapour, therefore, produced by evaporation at the surface of the globe, as it passes into the higher regions of the atmospheric space, is cooled and condensed, not by its own law of cooling by expansion, but by the cold of the gases; and the result is that a smaller quantity of vapour remains in the atmospheric column, with a given temperature and dew-point at the surface, than there would be in a pure vapour atmosphere, or than is now said to be indicated by the tension of the vapour found at the surface. That tension, he showed, was a consequence, not alone of the pressure of an incumbent column of vapour, but also of the resistance which rising vapour encounters from having to penetrate the gases while expanding upwards into the atmospheric space. As soon as elastic vapour is formed, the surface of the globe becomes the base on which it rests, and from which it is disposed to expand upwards. But the resistance of the gases prevents free expansion, and preserves a certain amount of density of vapour that would not otherwise be so early attained. The tension of vapour, therefore, only measures the degree of density that is thus produced, and does not indicate correctly the quantity that exists in the whole atmospheric column. Tables were exhibited by Mr. Hopkins to show the quantities of vapour—expressed in decimal parts of an inch of mercury—that would exist at different heights to the extent of 4,000 yards from the surface, in an atmosphere of pure vapour, and also in our mixed atmosphere, each being at the temperature and dew-point of 50° at the surface. And the excess in the quantity of vapour in the former above the latter was stated to show the extent of the error involved in the present mode of estimating the quantity of vapour in a vertical column of the atmosphere with the dew-point named— 50° .

MONDAY.

'On Nebulæ lately observed in the six-feet Reflector,' by LORD ROSSE.—This communication was illustrated by large drawings of the nebulae, white on a black ground, as they appear, giving an idea of their respective forms, and in general showing the resolution of the nebulae into their constituent stars.

Dr. ROBINSON gave a rapid sketch of the steps by which Lord Rosse was led to the construction of his instruments, the difficulties he met with in producing large speculæ of that most intractable and yet beautiful material speculum metal; which while it is as hard as steel is yet so brittle that a slight blow would shiver it to atoms, and so sensitive to changes of temperature that the affusion of a little warm water over its surface, not too warm to be disagreeable to the touch, would crack it in every direction. He then gave a sketch of the contrivances by which the leading difficulties were overcome. When describing the mould used with its metallic bottom of packed hoop iron, he stated, that the plan proposed by Mr. Potter, and now claimed in no measured terms as originating the entire improvements, had been tried and found utterly unfit for producing the proper surface. Dr. Robinson then gave a sketch of the processes of grinding and polishing, and of the adjustments and mechanical suspension of the instruments; and he stated that a deviation of the speculum from the parabolic form at its outside circumference which should amount to the 1-100,000th part of an inch would render it optically imperfect, and that a deviation from the proper focal length of any part to the amount of the 1-1,000,000th part of an inch could be detected. He also stated that Sirius when seen in it though the light was utterly insupportable to the unprotected eye, so that a person might as well attempt to look at it directly as at the concentrated light of the charcoal points produced by the action of Mr. Gassiot's battery; and the attempt made on one or two occasions by him was followed for several hours by a spot of light, varying from intense red to blue, being constantly before his eye; yet when properly viewed it was a beautiful sharp bead of intense light. He then read Lord Rosse's paper.—

"At the meeting of the British Association at York, in 1844, it was announced that a reflecting telescope of six feet aperture, which had been about two years in progress, was nearly completed, and some slight account was at the same time given of the means which had been taken to render the instrument convenient and effective. A short notice of the principal results which have since been obtained may perhaps not be uninteresting to the present meeting. In the beginning of February 1845 the instrument was so far finished as to be useable, and in the first instance it was directed to some of the brighter nebulae in Herschel's Catalogue. Many of them were immediately resolved, and very frequently the aspect and form of well-known nebulae were completely changed, fainter details not previously seen being brought out by the great light and magnifying power of the telescope. Before the end of April the wonderful spiral arrangement in 51 Messier was discovered. The speculum, though there was a slight defect of figure, was in fine working order, and defined with great sharpness when the air was steady. At the approach of the short nights when the season for observing the nebula was nearly over, the instrument was dismounted, as it was desirable to take the earliest opportunity of completing certain portions of the mechanism which had been put together in a temporary way in a rough state, and it was not till the close of the year that it was again in working order. During the year 1846, the examination of the nebulae in Herschel's Catalogue was continued, many sketches were made, and another spiral nebula was discovered 99 Messier. The moon was observed occasionally, and the superiority of the instrument with six feet aperture over that of three under equal magnifying powers in bringing out minute details was very remarkable, so great is the effect of light even when we have to deal with an object so bright as the moon with an aperture of three feet. As yet, however, but little time has been devoted to an examination of the moon: the moonlight nights have usually been taken advantage of for experiments on the polishing and figuring of the mirrors, and the information which has been obtained relates principally to matters of detail from which it would be premature to attempt to deduce general conclusions, suitable to the present notice. The succeeding year, 1847, there was but little done. Unprovided at that time with an assistant capable of making trustworthy use of the pencil and micrometer, and being almost wholly occupied with the duties incidental to a year of famine, it was impossible to do more than re-examine a few of the objects of the previous year. From the beginning, however, of the year 1848 till the present time the instrument has been constantly employed whenever the season and weather permitted it, and the following are some of the results:—H 604 was found in some degree to resemble the great spiral nebula 51 Messier, but it is a much fainter object, and appears to be made up of elliptic streaks disposed rather irregularly with a tendency to spirality, but without that distinct symmetrical spiral arrangement which is so marked a feature of 51 Messier. If H 51 Messier was seen somewhat obliquely and was considerably fainter it would probably very closely resemble it. H 854 has an arrangement of very elliptic annuli, and is apparently a system of the same class seen very obliquely. H 838, M 97 is a very extraordinary object, with a dark hollow centre somewhat in the shape of a figure of 8 easily seen; and with a disc irregularly shaded, but showing in the shading a decided tendency to spirality when seen under favourable circumstances: two stars are placed in a remarkable manner in the central opening. We may conceive it to be a spiral system greatly compressed; the edges are filamentous. H 2205 has a faint but large spiral appendage, to which the ray as figured by Herschel is in some measure a tangent. Several other nebulae are recorded in our note-books as belonging to the class of spirals. The well-known planetary nebula in Aquarius H 2098 which, in former years, had been often examined with a telescope of three feet aperture, and with no other result than that it exhibited a filamentous edge, when seen with the great instrument was found to have two ansae like Saturn. Many have since seen it, and the resemblance to Saturn out of focus has usually suggested itself. It is probably a

globular system surrounded by a ring seen edgewise; while H 450—which turns out to have a bright centre surrounded by a comparatively dark ring, and that again by a bright ring—though a much fainter object is not improbably a system of the same characters seen directly. H 84 and 86 is a remarkable group of nebulae. It consists of eight, two of them pretty bright. Such groups are not uncommon, but in this instance there are, I believe, more nebulae in a given space than in any other group we have noticed. It was observed by Mr. Stoney. The nebulae were not connected by any perceptible nebulosity, but there are cases where a nebulous connexion was distinctly traced; several minute nebulae, or nebulous knots hanging together as it were by a very faint but unmistakable nebulosity. The nebulae of Andromeda and Orion have of course been observed. As to Andromeda, there seems to be little doubt that the companion is resolvable, and the nucleus of the great nebula has that granular appearance which indicates resolvability. It has, however, not been seen as yet under very favourable circumstances, and we have not commenced a sketch of it. The nucleus was examined on three occasions, and the abrupt edge of the preceding streak in Mr. Bond's drawing was traced to its visible limits; but unfortunately he did not receive the drawing till the nebula was out of reach, otherwise of course more attention would have been directed to it. Subsequent to the receipt of the drawing, the nebula was seen by Mr. Stoney in my absence with the instrument of three feet aperture, but at a distance from the meridian. The appearance was very much as in Mr. Bond's drawing except that the contrast between the preceding portion as bounded by the preceding edge of the preceding streak, and the following portion of the nebula was much greater. The question, however, of most interest is, what do these streaks indicate? With the great instrument, dark streaks have been observed in many of the nebulae—sometimes almost straight as in Andromeda: for instance, H 887, H 1909, H 1041, H 1149, are cases in point, the streaks being nearly straight. H 1357, to which Mr. Bond refers, is if possible a still stronger case than it appears to be by Herschel's drawing, as I find a sketch in our journal showing that the appendage is part of the nebula, the nebulosity extending and encasing both extremities of the opening just as in Andromeda. We have also found a variety of examples of curved streaks; for instance H 264, H 491, H 406, H 731, H 854, H 875, H 1225, and others. Also H 1486, H 464, H 2241, besides the well-known annular nebula and the little annular nebula, figure 48, sketched by Herschel are some of the examples of nebulae with comparatively dark centres; the darkness being apparently of the same quality as the dark streaks but of a different shape. With these facts therefore I think it not improbable that the dark lines noticed by Mr. Bond in the nebula of Andromeda, and which with sufficient power are perceptible in so many other nebulae, sometimes nearly straight, sometimes variously curved, and also the dark spaces are all indications of systematic arrangement. When we see a dark space in the centre of a planetary nebula it is impossible to resist the impression that we are looking at an annular system bound together by some mysterious dynamical law. If we see a bright centre as in H 450 surrounded by a dark annulus, and that again by a bright annulus, we have a system of another kind and in the spirals of which 51 Messier is the most remarkable example we have yet found, we have a regularity of arrangement equally accordant with our preconceived notions of the order which should subsist in a regular independent system. The very elongated elliptic annular nebulae where the minor axis is sometimes almost evanescent, show us pretty clearly the nature of the slight, long, dark, and nearly straight streak in some cases found parallel to the axis of a long ray. A little consideration of the appearances which annular and spiral systems must present when viewed in different positions in some instances affords a pretty satisfactory explanation of the confused streakiness we have observed in several of the nebulae. This, however unsatisfactory it may appear, is the best explanation our working journal books at present afford of the streaks observed by Mr. Bond in the nebula of Andromeda. Mr. Bond's

paper has excited so much interest, and I have been so often questioned relative to it, that I have prematurely, in anticipation of more numerous sketches and measurements, which will probably throw additional light on the subject, ventured to lay before the Association the very little which is at present known to us. It was in the spring of 1846 that we first perceived the brighter portions of the nebula of Orion in the neighbourhood of the Trapezium breaking up into minute stars. Whenever the sixth star was nicely separated, this appearance was clearly perceptible. We had repeatedly examined Orion with the telescope of three feet aperture without a suspicion of its being resolvable; however, its resolvable character once known we were enabled with it on very fine nights to see some of the stars. With the six feet telescope the space within the Trapezium is still dark, just as Herschel describes it, and I feel convinced there is no optical illusion. Last season my attention was directed by Mr. Stoney to Orionis, which is on the edge of a dark spot; the dark spot includes the companion, and is about 12" diameter; we have not yet had an opportunity of examining it with the great instrument. A few copies from our collection of sketches accompany this notice: they have been made within the last day or two by a drawing master in the neighbourhood. He has transposed white for black, and enlarged the scale to make them more suitable for exhibition in the Section. In sketching we employ solely the black lead pencil, black representing light and the eye by habit makes transposition without effort. The copies are not quite accurate, but they are sufficiently exact for the purpose."

Prof. SEDGWICK acknowledged that these researches connected with the nebulae cut up by the roots the theoretic views he held of these assemblages; but at the same time stated that it gave him sincere pleasure to see facts so well worked out, and to yield to such evidence, and trusting that others would not exact too much on the opposite side, and draw from these facts conclusions which they by no means warranted. Prof. FORBES wished to ask whether the high reflecting power of silver might not with advantage be made available, by attaching a thin coat of silver to some other cheaper metal, for instance, cast iron. For he believed it had been well ascertained that speculum metal did not reflect 60 per cent. of the light, whereas the silver would reflect over 90 per cent.—Dr. ROBINSON replied that silver had been tried, and as it reflected about 95 per cent. of the light it made a very beautiful speculum at first; but unfortunately the rapidity with which it tarnished, soon reduced its reflecting power far below that of the speculum metal.

"On the Application of Graphical Methods to the Solution of certain Astronomical Problems, and in particular to the Determination of the Perturbations of Planets and Comets," by J. C. ADAMS, Esq.—After briefly pointing out the advantages of graphical methods, the author proceeded to give some instances of their practical application. It was shown that the solution of the transcendental equation which expresses the relation between the mean and extrinsic anomalies in an elliptic orbit is obtained in the most simple manner by the intersection of a straight line with the curve of sines. Attention was directed to Mr. Waterston's graphical method of finding the distance of a comet from the earth, and an analogous method was given for determining the distance of a planet on the supposition that the orbit is a circle in the plane of the ecliptic. The author then passed on to the more immediate object of his communication, the graphical treatment of the problem of perturbations of planets and comets. He first showed how to obtain geometrical representations of the disturbing forces, and then gave simple constructions for determining the changes produced by these forces in each of the elements of the orbit, in a given small interval of time. Having obtained the total changes of the elements in any number of such intervals, it was shown, in the last place, how to find their effect on the longitude radius vector and latitude of the disturbed body, and thus to effect the complete solution of the problem of perturbations without calculation.

"On the Determination of the Wave Length corresponding with any point of the Spectrum," by G. G. STOKES, Esq.—Mr. STOKES said it was well known to

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all engaged in optical researches that Fraunhofer had not accurately described and laid down by measurement certain dark lines in the solar spectrum. From these the wave lengths of these parts could be readily deduced. Now, he found that by a very simple species of interpolation, which he described, he could find the wave lengths for any point intermediate between two of them. He then exemplified the accuracy to be obtained by his method by applying it to the actually known points, and showed that in these vastly longer intervals than he ever required to apply the method to the error was only in the seventh place of decimals. By introducing a term depending on the square into the interpolation still greater accuracy was attainable.

'Additional Observations on Berkeley's Theory of Vision,' by Sir D. BREWSTER.—This was an essay which we could not hope to make intelligible without devoting more space to it than we can spare. In it the author by various arguments partly metaphysical, partly optical, and by examining the accounts of persons couched for cataract at an advanced period of life, which were relied on by the supporters of Berkeley's views (illustrating his views by several diagrams), considered he had overthrown every assertion essential to the maintenance of that theory, and especially the fundamental proposition from which that philosopher started.

'On the Heat of the Vaporization of Water,' by J. P. JOULE.—The object was to point out the complex nature of the heat hitherto taken for the latent heat of steam. In the exact experiments of Regnault 963° was found to be the quantity of heat evolved in the condensation of steam saturated at 212°; of this quantity 75° is the heat due to the *vis viva* communicated by the pressure of the steam, leaving 890° as the true heat of vaporization of water. In a perfect steam-engine supplied with water at 212°, and worked at atmospheric pressure without expansion, 963° will be the heat communicated from the fire to the boiler, 75° will be the heat utilized by conversion into force, and the remainder 890° will be the heat given out in the condenser.

SECTION B.—CHEMISTRY, INCLUDING ITS APPLICATIONS TO AGRICULTURE AND THE ARTS.

'Researches on the Theory of the principal Phenomena of Photography in the Daguerreotype Process,' by A. CLAUDET.—The various subjects treated by Mr. Claudet were the following:—1st. What is the action of light on the sensitive coating? 2nd. How does the mercurial vapour produce the daguerreotype image? 3rd. Which are the particular rays of light that impart to the chemical surface the affinity for mercury? 4th. What is the cause of the difference in achromatic lenses between the visual and photogenic foci?—why do they constantly vary? 5th. What are the means of measuring the photogenic rays, and of finding the true focus at which they produce the image? Light produces two different effects on the daguerreotype plate capable of giving an image. By one the surface is decomposed and the silver is precipitated as a white powder,—this action is very slow. By the other, the parts affected by light receive an affinity for the mercurial vapour, and this metal is deposited in white crystals. This action, which is the cause of the daguerreotype image, is 3,000 times more rapid than that producing the decomposition of the surface. After having examined the phenomena of these two actions, Mr. Claudet considers that it is impossible to refer them to the same cause. The first is a chemical decomposition of the surface,—and the second is a mere new property imparted to the surface to attract the vapour of mercury, which is given by some particular rays and withdrawn by some other rays. The most refrangible rays produce the affinity for mercury, and the less refrangible withdraw it. Mr. Claudet afterwards explained the principle of his photophotometer, and several improvements he has lately made in that instrument, by which he can compose upon the same plate a series of intensities in a geometrical progression, varying from 1 to 312,—and when employing two plates at the same moment from 1 to 8192; and by another modification of the instrument he can, by shutting one-half of every hole through which the light has affected the plate and submitting this half to radiation through red, orange or yellow glasses, he can study the modi-

fications produced on the various intensities of effect by their coloured or insulated radiation. The experiments to which Mr. Claudet refers would be too long to enumerate here; and we shall conclude by alluding to the most important point of this paper,—which is the question of the difference between the visual and photogenic foci, and the constant variations they undergo by the influence of unknown causes, at all events, which he has not been able to ascertain. It is known that several years ago Mr. Claudet was the first to point out the difference between the two foci and the necessity for the operator to place exactly the plate at the point where the photogenic focus is produced in order to have a correct daguerreotype image. But the new important fact lately observed by Mr. Claudet refers to the constant variation between the proportionate distance of these two foci. It appears that, according to some causes which Mr. Claudet has not been yet able to discover, the two foci for the same distance of an object are sometimes coinciding and sometimes very far one from the other; and what is most remarkable is that the difference varies according to some properties of the lenses, in such a manner that when the two foci coincide in some lenses they may be very much separated in the other.

Mr. HUNT made some remarks on the peculiar distinctions observed in the phenomena of luminous and chemical action,—which led him to infer that they were different in all their phenomena although associated in action.—Dr. MILLER stated that he had in pursuing this inquiry been led to observe that the dark bands of the spectrum were extended in a remarkable manner over the space usually regarded as the most actively chemical; and he hence inferred, seeing that the interruptions of chemical action on sensitive surfaces were coincident with the bands observed on turmeric paper, that the chemical action was due to the luminous principle,—that, indeed, there was no difference between the action of light and the principle, which Mr. Hunt was disposed to regard as dissimilar to it.—Mr. HUNT admitted the value of Prof. Miller's investigations,—but he was at present disposed to regard the facts observed as proving merely that actinism and light obeyed the same laws of motion.—Dr. DAUBENY made a few remarks on the unfortunate character of the name adopted to distinguish this chemical principle of the sun's rays.

'Inquiries on some Modifications in the Colouring of Glass by Metallic Oxides,' by M. G. BONTEMPS.—In this communication some important practical points connected with the coloured ornamentation of glass and porcelain were brought forward. In the first place it was shown that all the colours of the prismatic spectrum might be given to glass by the use of the oxide of iron in varying proportions and by the agency of different degrees of heat,—the conclusion of the author being that all the colours are produced in their natural disposition in proportion as you increase the temperature. Similar phenomena were observed with the oxide of manganese. Manganese is employed to give a pink or purple tint to glass, and also to neutralize the slight green given by iron and carbon to glass in its manufacture. If the glass coloured by manganese remains too long in the melting-pot or the annealing-kiln, the purple tint turns first to a light brownish red, then to yellow, and afterwards to green. White glass in which a small proportion of manganese has been used is liable to become light yellow by exposure to luminous power. This oxide is also in certain window glass disposed to turn pink or purple under the action of the sun's rays. M. Bontemps has found that similar changes take place in the annealing oven. He has determined, by experiments made by him on polygonal lenses for M. Fresnel, that light is the agent producing the change mentioned; and the author expresses a doubt whether any change in the oxidation of the metal will explain the photogenic effect. A series of chromatic changes of a similar character were observed with the oxides of copper; the colours being in like manner regulated by the heat to which the glass was exposed. It was found that silver, although with less intensity, exhibited the same phenomena; and gold, although usually employed for the purpose of imparting varieties of red, was found by varying degrees of heating at a high temperature and recasting several times to give a great many tints,

varying from blue to pink, red, opaque yellow, and green. Charcoal in excess in a mixture of silica-alkaline glass gives a yellow colour, which is not so bright as the yellow from silver,—and this yellow colour may be turned to a dark red by a second fire. The author is disposed to refer these chromatic changes to some modifications of the composing particles rather than to any chemical changes in the materials employed.

Dr. FARADAY spoke on the importance in all our inquiries of associating physical and chemical science. In the beautiful facts brought forward by M. Bontemps it appeared that many of the changes of colour mentioned are purely physical. The phenomena of the change of manganese from white to pink in glass appeared to him inexplicable as a chemical effect.—Mr. DILKE inquired upon what peculiarity depended the differences discovered to exist in the coloured glass of the windows of old churches and that of modern manufacture.—M. BONTEMPS stated that the observed differences were entirely due to age and imperfections in manufacture.—Dr. FARADAY remarked that any irregularities tended to produce the diffusion of the rays which permeate the glass; and that the opacity of ancient church windows was probably due to a superficial change of the external surface.—M. BONTEMPS stated that old glass was by repolishing rendered as transparent as any modern glass.

'Report on the Heat of Combinations,' by Dr. ANDREWS.—Every molecular change in the condition of matter is almost invariably connected with the evolution or the absorption of heat; and the quantity of heat thus set free or absorbed bears always a definite relation to the amount of the mechanical or chemical action. To ascertain this relation has been the object of Dr. Andrews in this investigation. The Report gives a general view of the actual state of our knowledge on the subject of thermo-chemistry. We cannot condense within the limits of our journal the numerous points of interest involved in this Report. They are of the highest scientific interest,—and will be published entire in the Journal of the Association. The following are a few of the principal points:—1. The solution of a salt in water is always accompanied by an absorption of heat. 2. If equal weights of the same salt be dissolved in succession in the same liquid, the heat absorbed will be less on each new addition of salt. 3. The heat absorbed by the solution of a salt in water holding other salts dissolved is generally less than that absorbed by its solution in water. 4. The heat absorbed by the solution of a salt in the dilute mineral acids is generally greater than that absorbed by its solution in water.—It was further shown by Dr. Andrews that in reference to the combination of acids and bases, the heat developed during the union is determined by the base, and not by the acid. An equivalent of the same base combined with different acids produces nearly the same quantity of heat. When a neutral salt is converted into an acid salt by combining with one or more equivalents of acid, no disengagement of heat occurs. When a double salt is formed by the union of two neutral salts, no disengagement of heat occurs. When a neutral salt is converted into a basic salt, the combination is accompanied by the disengagement of heat. When solutions of two neutral salts are mixed, and a precipitate formed from their mutual decomposition, there is always a disengagement of heat, which, although not considerable, is perfectly definite in amount. Numerous results illustrative of this point were given. The combinations of metals with acids, and their combustion in oxygen, were then examined. The actions of chlorine, iodine, and bromine were also detailed, and the heat developed by the combination of these bodies with metals shown.

Prof. MAGNUS asked if Dr. Andrews had noticed any difference in the heat of combination of bodies in different allotropic states,—as, for instance, the diamond, graphite, and carbon.—Dr. ANDREWS stated that the diamond disengaged 7824 units of heat during its combustion in oxygen gas,—in the form of graphite, 7778 units,—and in that of wood charcoal, 8080. It had also been thought that differences had been observed in the heat disengaged in various allotropic states.

'On the Compounds of the Halogens with Phosphorus,' by J. H. GLADSTONE, Ph.D.

'On Artificial Gems,' by M. EDELMAN.—This was merely a note accompanying some specimens of artificial gems prepared by M. Edelman under the influences of heat and pressure, as described in his communications to the Academy of Sciences of Paris.

'On a New Method of determining the Organic Matter in Water,' by Prof. FORCHHAMMER.—The test which he applies is hypermanganate of potash or soda,—which he prepares in this way. He heats the hydrate of potash or soda with chlorate of potash and the peroxide of manganese, according to the method of Wöhler. After heating, the salt is thrown into water, and so much diluted muriatic acid is added that it assumes a bluish red colour,—upon which carbonic acid gas is let through, until the colour has become bright red, and the manganate of potash completely converted into hypermanganate. The liquid must be cleared, either by allowing it to deposit all the oxide of manganese, or by filtering it through asbestos. This liquid may be kept for a very long time unaltered in a glass vessel with a glass stopper. The next process is to ascertain the strength of the test,—which is done by taking any determined measure of it, mixing it with water and a little alcohol, and then heating it. All the manganese is thrown down, and after being washed and exposed to a strong red heat, it is the compound oxide of manganese, $3\text{Mn} + 4\text{O}$. This test is now applied in such a way that, for instance, one pound of the water which is to be tried is mixed with a small quantity of the test and boiled. If the colour has disappeared, another quantity is added, and the liquor again boiled, until, in going on in that way, the red colour of the liquid does not disappear any longer. After that, it is allowed to cool,—and then the quantity of hypermanganate of potash, which has not been decomposed for want of organic matter in the water, is determined by comparing its colour with distilled water; to which have been added very small determined quantities of the test solution. If the quantity of the test which is thus added in excess is subtracted from the whole quantity which has been used, the real quantity of decomposed hypermanganate acid is determined, and thus also the quantity of organic matter itself. This method is liable to one fault,—viz. that the nature of the organic matter may be different, and accordingly require different quantities of the test liquor to be decomposed. But the organic matter which generally occurs in water is approaching almost always to humic acid, and thus the determination of the organic matter allows it to be compared. As to that part of the organic matter in water which contains nitrogen, the author thinks that he has found out a method for determining it by itself; but not having yet finished his experiments on that point, he must leave it out of the question. Water taken from a greensand spring about twelve miles from Copenhagen contained so little organic matter that one pound only required six measures of a test solution, of which 100 measures contained the manganese of 0.526 of the double oxide of manganese; while water taken from a lake which communicates with a peat moss required 1 lb. 74 measures of the same liquor. Prof. Forchhammer, continuing for a whole year every week this analysis of the water which is used for supplying Copenhagen, observed the following facts:—1st. The quantity of organic matter is greatest in summer. 2nd. It disappears for the most part as soon as the water freezes. 3rd. Its quantity is diminished by rain. 4th. Its quantity is diminished if the water has to run a long way in open channels.

Mr. WEST asked if all organic substances were oxidized by the salt in question.—Prof. FORCHHAMMER replied, that nitrogenous organic matters occasioned a precipitate by chloride of gold,—which precipitate, on analyzing according to the ordinary method, gave ammonia. But whether or not all the nitrogen was thus thrown down he had not yet determined.—Some further conversation ensued, in which Dr. Faraday, Prof. Rogers, and Dr. Daubeny took part.

[It might appear from the construction of the sentence in our report of the conversation which ensued upon reading Dr. Scoffern's paper (*ante*, p. 935), that the galvanic process had been employed in that gentleman's process of refining sugar. We are requested to state that he does not employ it.]

Birmingham, Sept. 13.

Permit me to direct your attention to one portion of your report on my paper read at the British Association,—a portion which, as it stands, would seem to imply a remark of Dr. Faraday adverse to my operation,—which was not the case. I was asked by a member, whom I did not recognize, whether I could offer any opinion as to the practicability of removing lead from solutions of sugar by means of the galvanic agency,—not in my process, but in contradistinction to my process. I replied, that a refiner, who had tried this means of removal, informed me it did not answer. Whereupon, Dr. Faraday expressed his opinion that the galvanic agency, however applied to such purpose, never would answer. As the use of voltaic electricity is no part whatever of my process,—indeed, is one concerning which my opinions are entirely in accordance with those of Prof. Faraday—you will readily see how desirous I am of placing the matter in its true light. I have, &c. J. SCOFFERN.

SECTION C.—GEOLOGY AND PHYSICAL GEOGRAPHY.

'On the Distribution of Gold Ore over the Earth's Surface, and on the Structure of California, as compared with that of the Ural Mountains,' by Sir R. I. Murchison.—The author exhibited an enlarged Mercator's projection of the World, taken in great part from a general sketch-map, by M. A. Erman of Berlin, on which all the leading ridges affording gold ore in times past or present were marked, also an enlargement of the map of California by M. Erman, and his own large map of Russia, and sections in the gold-district of the Ural. After referring to the works of Humboldt and others, Sir Roderick gave a condensed view of his own observations on the gold region of the Ural Mountains, which had led him to form the opinion, that gold veins had generally been produced where certain rocks of intrusive character, viz. greenstones, porphyries, sienites, granites and serpentines, had been intruded through palæozoic rocks, particularly as respects the Ural, among those of the Silurian epoch. It is, in short, where clay slates, limestones, and greywacke sandstones have been penetrated by such igneous rocks that quartz veins abound, and with them a diffusion of gold ore in grains, leaf and veins. All the phenomena of Siberia to the East of his own observations are lithologically and geologically similar to those of the Ural. To the general view of Baron von Humboldt, that the richest gold deposits are those which are derived from ridges having a meridian direction, M. A. Erman is decidedly opposed; but Sir Roderick is of opinion, that although we may be unable to explain the cause, it is a fact that the greatest quantity of gold ore has been obtained from chains having a nearer relation to north and south than to equatorial or east and west directions, due perhaps to the general form of the chief masses of land, and the prevailing strike of the Palæozoic rocks. He next pointed out the error into which some persons had fallen, of supposing that the Uralian mines were worked underground; the only small subterranean work being one near Ekaterinburg, which affords a very slight profit. All the other mines along that north and south chain, throughout 8° of north latitude, are simply diggings and washings which are made in the detritus or shingle accumulated on the slopes of the ridges and in the adjacent valleys, and with one exception are all upon the east side of the range. This phenomenon in the Ural Mountains is a necessary result of their structure; the older deposits through which the eruptive rocks have risen constituting chiefly the crest and eastern slopes of the chain, whilst the western slopes are occupied by deposits of younger or Permian age. As the conglomerates and detritus of the latter rock contain no traces of gold, though they abound in copper ores, it was pointed out in the work on Russia that the auriferous veins were produced after the accumulation of the Permian system. Comparing California with the Ural, Sir Roderick showed that there was a very great coincidence of mineralogical structure, and that with these constants the same results obtained; the chief distinction consisting in the apparently larger proportion of gold in the detritus of the newly-discovered deposits in California than in those of the Ural. He contended, however, against the inference that any large tract of California would be found to be as uniformly auriferous as the banks and slopes of the upper tributaries of the Sacramento. That gold ore has been found from latitude 36° to latitude 40° along the western slope of the Sierra Nevada is admitted, but the longitudinal extension or breadth of the auriferous

detritus of California has yet to be ascertained. As, however, the lower or coast ridge which passes by San Francisco seems to be in miniature what the higher parallel mountains are upon a larger scale, in being composed of greenstones, porphyries, greywacke sandstones and quartz rocks, it is probable that very much of the great intervening valley of the Sacramento may be strewed over at intervals with auriferous debris. And here the author took some pains to indicate the distinctions between all such surface mining operations as those of Siberia, California, and the Brazils, and those works in which besides the ores of silver, copper, &c. gold also had been extracted from the veins in the solid or parent rock, as in Mexico and many other parts of the world, and in such cases the nobler metal is usually associated with amalgam of other ore, which renders its extraction very costly. In adverting to the remarkable fact, that when found in superficial detritus the associated ores of the parent veins have disappeared, he accounted for this phenomenon by the oxidation and wear of the other metals, and the resistance of gold and its frequent accompaniment, platinum, to such action, and to their superior weight, which had enabled them to withstand the strong action of former denudation like the quartz veins of the original matrix. Adverting to the facts that in the Ural Mountains, where little or no admixture with other ores existed, the veins "in situ" have proved very slightly remunerative when worked further downwards, he glanced at a view of Humboldt, who, looking to the great lumps or "pepites" occasionally found in the surface rubbish, supposed that there may have been some connexion between the production of gold and the atmosphere; since judging from these specimens it was from the superficial extremity of these quartz veins that the richest branches of gold must have been derived; the veins when followed downwards having usually proved unproductive. As, however, there are cases (chiefly on a small scale, as in Hungary) where gold ore continues to ramify in veins of great depths beneath the surface, the author contents himself with dwelling upon the important statistical fact, that all the great masses of gold ore have been and are derived from superficial rubbish; the major part of this detritus he carefully distinguishes from modern alluvia, and shows that it has been the result of former and more powerful causes of degradation than those now in operation,—causes which distributed coarse shingle and blocks and sand, with occasional large lumps of gold, and wearing away all the associated schists, and the most oxidizable ones, left only the harder rocks, particularly the quartz veins, together with the harder, purer and nobler metals, gold and platinum. The existing rivers have little more to do with this phenomenon than that in mountainous tracts, and where they have a rapid descent, they have laid bare the edge of the previously formed gold accumulations. By this observation it is not meant to deny, that where existing streams flow directly from rocks "in situ," which are now impregnated with gold, auriferous detritus must not naturally be the result, but simply to prevent the student who may refer to detailed maps of gold tracts from imagining that the rivers are auriferous except when they derive that quality from the wearing away and breaking down of the mixed materials which constitute their banks. In a word, British geologists may be assured, that gold shingle and sand have been accumulated just in the same manner as the former local drifts of their own country, and that in both, bones of mammoths, rhinoceros and extinct quadrupeds occur. Having terminated his account of the geological constants which accompany gold mines in Europe, Asia and America, Sir Roderick then traced the history of gold and its development as known to the ancients and our ancestors of the middle ages. He showed that in all regions where rocks similar to those he had described occurred, there gold had been found in more or less quantities, and that just in proportion to the time that a country had been civilized had the extraction and produce of the precious metal diminished; so that in many tracts where it formerly prevailed to some extent, it had been either worked out or the mines have been almost forgotten. Briefly alluding to the examples at home of gold works in Wales under the Romans, where Silurian rocks are

perceived by trap and contain veinstones as described by himself, and to the former gold of Scotland and Ireland, and its occasional discovery in the detritus of the county of Wicklow, and its diffusion in some of the oldest strata of Merionethshire. He particularly dwelt on the Continental tracts formerly so rich, as cited by Strabo, all of which, with the exception of the north Ural or country of the Arimaspe, from whence the Scythian ores came, were no longer gold-bearing districts. The Scythian or Uralian tract had, in fact, remained unknown and unattended to from the classical age until this century, and so completely ignorant were the modern Russians of the existence of gold in the Ural Mountains, or that they had in their hands the country which supplied so much gold to Greece and Rome, that excellent German miners had long worked the iron and copper mines of that chain before any gold veins were discovered. These also were worked as solid veins in the rock for some time before the accidental discovery of a small per centage of gold ore in the ancient alluvium or drift led to the superficial diggings, which produced at an infinitely less expense ten times the amount of produce of the mines in the solid rock near Ekaterinburg. All the energy displayed by the Russian miners having failed to augment the amount of Uralian gold, and as it has never much exceeded half a million sterling, the period is gradually arriving when the local depressions or basins of auriferous detritus of that region will be successively dug and washed out, and the Ural will then resemble many other countries in possessing actual mines of iron and copper, but merely a history of its gold. Russia, however, has also the golden key of all eastern Siberia, in which various offshoots from the Altai chain, and chiefly those which, separating the rivers Lena, Jenisei, &c. stretch along the shores of the Baikal Lake, and have proved so very productive, that for some years they have afforded a greater supply of gold (three millions sterling average, exclusive of the Ural) than all the other gold-bearing countries of the world. As in the Ural Mountains, so in California, notwithstanding their keen scent for gold from the days of Columbus to the present time, the Spaniards never knew of its existence in the valley of the Sacramento, which tract they left in quiet possession of the native Indians; and it was only by the recent accident of the breaking away of a bank of detritus by a mill-race that this region was opened out for the first time to the new colonists of the Anglo-Saxon race. What, then, is to be the value and duration of these Californian mines? On the point of absolute value the author does not venture in the absence of sufficient facts and statistical data, but in regard to the duration of the mining ground of California, he speculates that if he be locally so much richer than the similarly constituted detritus in the Ural, still there is nothing to interfere with the belief founded on all past experience, that with the activity now employed in the works they may not be neglected or abandoned in a given time. The very great per centage of gold ore in the valleys of the Sacramento seems to indicate that the most valuable portions of the original veins have been ground down by former powerful denuding agencies; and as the rule obtains very greatly in mining, that the richer the veins the less are they likely to be spread over a large mass of parent rock, so is he disposed to think, that it will only be in certain patches that very great wealth will be discovered, and hence that it would be hasty to conclude that because rich gold detritus has been discovered near the sources of the Sacramento in lat. 40°, and also on the river Colorado in lat. 34° 5', that all the intermediate tract of country (of 4 degrees of lat. and 1 of long.) should prove equally productive. Considering the vast addition in the few last years of nearly four millions sterling per annum made to the European market by the researches in Siberia, and seeing how little effect such addition has produced in the value of gold, the author is of opinion that the Californian discovery is not likely to produce any material disturbance in the standard. At the same time he expresses his full agreement with M. Erman and others, that with the advancement of colonization in the central regions of North Asia and other parts of the world where civilization has not yet extended, other gold tracts may be discovered wherever the

geological and lithological constants to which he has adverted occur; but neither would this circumstance induce him to fear that such discoveries (which can only take place at long intervals of time) will more than compensate for the wear and tear of the precious metal, and supply the wants of the rapidly increasing population, and more highly advanced state of civilization. Sir Roderick then briefly alluded to the erroneous opinion of old authors, that the origin and production of gold had any reference whatever to hot or equatorial climates, as testified by the abundance of ore in Siberia even up to 67° north lat., and cited a table by M. Erman which showed that by far the greatest quantity occurred in northern latitudes, there being every probability, according to that author, that much more of the ore may be discovered in the northern prolongation of the American chains, and in the frozen regions of Russian America, just as he had discovered in ridges of the far north-east of Siberia, and near to Kamtschatka. He reminded his geological auditors, that in considering the composition of the chief or eastern ridge of Australia and its direction from north to south, he had foretold (as well as Colonel Helmersen of the Russian Imperial Mines) that gold would be found in it, and he stated that in the last year one gentleman resident in Sydney who had read what he had written and spoken on this point, had sent him specimens of gold ore found in the Blue Mountains, whilst from another source he had learned that the parallel north and south ridge in the Adelaide region, which had yielded so much copper, had also given undoubted signs of gold ore. The operation of the English laws by which noble metals lapse to the Crown, had induced Sir Roderick Murchison to represent to Her Majesty's Secretary of State that no colonists would bestir themselves in gold mining if some clear declaration on the subject were not made; but as no measures on this head seem to be in contemplation, he infers that the Government may be of opinion, that the discovery of any notable quantity of gold might derange the stability and regular industry of a great colony, which eventually must depend upon its agricultural products. A periodic discovery like that in California may indeed in the hands of adventurous and unbridled speculators, force a considerable quantity of surface gold so suddenly upon the market, that a momentary apprehension of a great change in its relative value may be entertained; but looking to the mineralogical and geological structure of America, and seeing how large a portion of that continent is made up of rocks precisely similar to those which have afforded the gold shingle and sand of the Sacramento, and knowing that all the other far-famed gold districts of the New World have had assignable limits in their productive capacities, and that many of their sources have disappeared or become valueless, he believes that the time will come when the rich soil of the valleys of California, like that of the banks of the Rhine, the Guadalquivir and the rivers of Bohemia, will alone be turned up by the plough, or serve as pasture lands, to the entire abandonment of gold hunting.

The President confirmed the statement of Sir R. Murchison, that little advantage had ever been gained by mining the solid rocks containing gold; the deposits from which it was obtained consisted of the detritus of these rocks produced by the action of the sea in former ages; they were not mere river beds now in process of formation, but portions of that wide spread drift, containing frequently the bones of the mammoth and other extinct animals, which is found also in this country. He did not consider the evidence conclusive, either that there was most gold near the surface of the auriferous rocks, or that the auriferous chains were mostly meridional.—Prof. W. ROGERS stated that the position and relations of the gold ore in the United States, occurring principally in Virginia and Carolina, had been ascertained in the course of the Government surveys; the gold was uniformly associated with or imbedded in quartz rock, forming veins in the talcose and micaceous schists and altered sandstones. Gold was once procured there in such abundance and with such facility as to create an interest almost equal to that of California in the public mind: so long as the operations were restricted to washing the detritus of the valleys and principal streams, the produce was abundant and largely repaid the labour; but these comparatively

superficial deposits were often very rapidly exhausted from the wasteful mode of conducting the works, and as soon as mining in the solid rock was attempted, an almost universal destruction of the mining societies took place, producing very extensive disasters, and finally amounting to a serious public calamity. It was probable that this difficulty in obtaining gold by mining was universal, and continued at all depths; it was partly owing to the association of the gold, in solid rocks, with iron pyrites and ores of copper and lead, so blended as to cause great difficulty and expense in separating them; near the surface of the rocks this process seemed to have been accomplished by atmospheric agency, for it was impossible to suppose that the gold was originally most pure and abundant over what is now the surface. From the decomposition of these metallic ores the auriferous quartz of the United States is known as "honey-comb" quartz, or by the miners as "bloom of gold," since it occurs scattered over the surface where the gold-producing veins exist. The general trend of the old metamorphic rocks in the United States is north-east by south-west, and the gold veins conform to this general direction, being frequently interposed between the strata instead of crossing them. Gold had been found at intervals all the way from Lower Canada to Central Georgia, a distance of 1,000 miles, and although insignificant in quantity, as compared with California, it occurred under the same conditions. Prof. Rogers was of opinion that after a few years the amount of gold obtained in California will greatly decline, without having inundated the world to such an extent as the hopes or apprehensions of some have led them to suppose.—Prof. SEDGWICK contended that the age of the rocks was not a constant phenomenon in connexion with gold, but that the condition of the rocks did appear to be constant; in the Alps, lias and still more modern rocks were seen passing into the condition usually characteristic of the "primitive," but such instances were extremely rare: in this country gold was found in the Devonian rocks of St. Austell, as well as in the granite of Shap Fells. Prof. Sedgwick also disputed Humboldt's generalization upon the direction of auriferous chains, which were not generally north and south any more than mountain chains were mostly north and south. He then described the manner in which the tin ore is separated from the alluvial soil in Cornwall, by "jigging," or agitating it in a basket with water, by which the soil is washed away and the heavier ore remains; it was by a similar process, carried on upon a large scale, that nature formed the Californian gold-field; the Sierra Nevada had been agitated beneath the waves of the sea until thousands of feet of solid rock had been broken up, the lighter and more soluble materials carried far away, and the heavy particles of gold spread out with the detritus remaining in the valleys immediately below the hills. Such deposits could not be uniformly rich, and the most productive would probably be first discovered; there was no fear, however, of obtaining too great a quantity of gold,—the population of the world was increasing, and for whatever purposes gold was useful a larger quantity was required. The mode in which it was accumulated in particular countries ought to be considered as much a manifestation of the benevolence of Providence as the accumulation of coal in some countries to the exclusion of others, since, if the existing quantity were diffused over the whole globe, it would be lost beyond recovery, and cease to minister to the use of man.—Sir H. DE LA BECHE also argued that the mineral and physical conditions, rather than the age of the rock, were connected with the accumulation of any particular ore. The tin ore, formerly supposed to be confined to the most ancient rocks, was now known to abound in the equivalents of the coal measures. Gold veins must have been liable to be broken up and re-distributed in ancient times as well as more recently, and indeed much of the auriferous pyrites occurred in rocks which had once been mud, the grains of gold forming the nucleus around which the sulphuret of iron had formed. Most of the metallic ores had been deposited in hollows from a state of solution, and in some instances they occurred in isolated cavities, and must have passed through the pores of the rock like the pseudomorphous crystal of tin in cavities originally occupied by feldspar in the granite of Cornwall. Changes by atmospheric action were known to occur in lodes

containing copper ore, metallic copper being found at the back of the lodes, produced by the decomposition of the ore and precipitation of copper, as in the electrolytic process,—from the same cause carbonate of lead was common at the tops of lead lodes. The case with gold was different; gold could not decompose or drift far, and must sink down amongst the detritus of the original rocks and remain near the shore. He considered that the fact of gold being most abundant in the older rocks was owing to the fact of those being the rocks most frequently in the requisite mineral and physical conditions.—Mr. C. DARWIN stated that he had visited a gold mine on the east side of the Cordillera, in rocks much newer than the Neocomian series; the mines were poor, but the comparatively modern origin of the rocks was indubitable.—Sir R. MURCHISON, in reply, observed that he believed all rich gold veins were confined to the older Palæozoic rocks, but his observations did not relate to the occurrence of minute quantities.

'Report on the Statical and Dynamical Facts of Earthquakes,' by R. MALLETT.—The Report commences with a *résumé* of the literature of the subject, and of the past theories of their origin, divisible into two classes:—those which attributed them to atmospheric agents, and those which supposed a cause operating beneath the surface. From the consideration of all the existing records, the following propositions are (provisionally) enunciated:—1. Earthquakes occur over all parts of the earth's surface, both on land and under the ocean. 2. They occur at all times, at all seasons, and at all hours of the day and night. 3. There seems no sufficient ground for supposing that they have operated more frequently or with greater intensity during one portion of past time than at any other. 4. Or that one part of the earth's surface has always been more liable to them than another. 5. But those regions which surround the present great centres and lines of volcanic action do appear to be now most subject to earthquakes. 6. And earthquakes are most prevalent and most violent in proportion to the activity and intensity of volcanic action in those regions at given times. 7. Many regions which are not now, nor present any appearance of having been, theatres of volcanic action, are subject to very frequent earthquakes. 8. Regions of extinct volcanic action do not appear more subject now to earthquakes than others altogether non-volcanic. 9. Although active volcanic regions are not frequently affected by earthquakes, yet the most violent recorded earthquakes appear to have convulsed regions lying some degrees away from the nearest volcanic centre. 10. And in general the most violent earthquakes have occurred upon the sea-coasts, or not far inland; some doubt, however, hangs over this in connexion with very ancient earthquakes in Asia. 11. Earthquake shocks have been felt on the ocean at vast distances from any land; and in some cases they have been nearly vertical in places where the depth was profound, and no phenomena occurred at the surface of the ocean indicative of volcanic action beneath. 12. The earth-wave or shock is a motion of great velocity, and occurring during a short moment of time at any given spot. 13. The total duration of motion at a given spot varies indefinitely, or between limits which have not been ascertained. 14. The absolute area convulsed at one earthquake epoch varies within indeterminate limits, and is related apparently to the maximum force of the shock in its extent. 15. The shock, or earth-wave, is a true undulation of the solid crust of the earth. 16. The undulation, which constitutes the earth-wave, has a real motion of translation. 17. The direction of translation of the earth-wave varies from vertically upwards to nearly horizontally in any azimuth. *a*, Shocks felt at great distances from their origin are nearly horizontal in transit; *b*, Within a certain radius round the origin they are sensibly inclined in transit; *c*, Some of the most destructive have emerged vertically; *d*, The direction of transit often varies during one earthquake; *e*, Two shocks may arrive nearly simultaneously at the same point with different transit directions. 18. The motion of translation of the earth-wave is rectilinear, and not curvilinear. 19. It has in all cases a true wave form upon the surface, and when its direction is nearly horizontal, the crest of the wave advances along a given line and parallel to itself. 20. The earth-wave has deter-

minate dimensions in height and breadth, dependent on the force of the original impulse. 21. The velocity of its transit has not yet been determined by observation or experiment; it is proved, however, to be immense, and dependent on the elasticity and density of the formations through which it passes. 22. The direction and velocity of transit change occasionally in passing from the boundary of one formation to another. 23. Earthquakes occur which are accompanied by various sounds having a subterranean origin, which sounds may either precede, accompany, or succeed—or occur both before, during and after—the shocks, or some of them; other earthquakes, of the greatest violence, are unaccompanied by any sounds whatever. 24. When the centre of impulse of an earthquake is under the sea, and within a certain (usually a comparatively small) distance of the land—the sea, at about the moment the shock is felt along the shore, retires slightly, and then again rolls in as the great sea-wave of translation, at a certain interval after the shock, depending on the distance of the centre of impulse.

Earthquakes, however great, are incapable of producing any permanent elevation or depression upon the surface of the earth by their direct action. But by their secondary effects they change it in various ways, thus: 1. Vast land-slips take place. 2. New lakes and river-courses are formed and old ones obliterated. 3. New valleys are hollowed out. 4. Fissures of various sizes are formed; in rocks or buildings by direct action; in incoherent or loose materials by subsidence or lateral disturbance, by the action of water. 5. At the moment fissures are formed fire and smoke (apparently) have been observed to issue. 6. Water often spouts from fissures, wells and springs burst up unexpectedly from the ground at the moment of the shock. 7. The great sea-wave when it comes ashore after the earthquake produces all the effects of a great debacle.

The report then proceeds with the relation to earthquakes of, 1st, the weather generally and the predictive effects on animals; 2, the barometer; 3, the thermometer; 4, the rain-gauge; 5, the electrometer; 6, the magnetometer; 7, the aurora,—both during long periods antecedent to the earthquake, immediately prior to it, and as modified subsequently by the effects of the earthquake. It then treats of the nature of the impulse producing originally the earthquake shock; and concludes with stating some of the most important desiderata of earthquake knowledge, viz.:—1, Large determinations of the moduli of elasticity of the substances forming the crust of the earth; 2, systematic and connected observations with self-registering seismometers of the direction and other elements of earthquake shocks; 3, direct experiments as to the rate of transit through the various formations of the earth's crust of the shock when artificially produced, to be measured by the author's seismoscope.

SECTION D.—NATURAL HISTORY, INCLUDING PHYSIOLOGY.

'On the Occurrence on the British Coast of a Burrowing Barnacle, being a type of a new order of the class Cirripedia,' by Mr. A. HANCOCK.—The animal which was the subject of this paper is called by the author *Alcioppe lampas*. It inhabits the dead shells of various species of mollusca, which it appears to penetrate, and constructs for itself a residence by some process of boring. The author had an opportunity of watching its development from the egg; and during the early parts of its existence it presented all the characters of many of the forms of entomostracous Crustacea. The author made some remarks on the relation of this animal to the other orders of Cirripedes, and proposed to constitute for it a new order which he called Cryptosomata. The paper was illustrated by drawings of the animal and dissections of some of its parts.

Mr. DARWIN remarked that having been employed for a considerable time in drawing up a monograph on the Cirripeda for publication by the Ray Society, he felt great interest in Mr. Hancock's paper—more especially as he had collected in South America an allied form, inhabiting cavities in the *Concholepas Peruviana*. Its main affinity to the genus described by Mr. Hancock lies in the number and position of the cirri and the great development of the labrum:—the metamorphosis

and organs of generation appear to be considerably different. Mr. Darwin stated that he possessed the type of another and quite distinct order of Cirripedes, entirely destitute of any shell, covering, or peduncle, without cirri, and with a suctorial mouth of very peculiar structure. Having remarked on the vast external differences between the common cirripedes and such forms as the last mentioned and that described by Mr. Hancock, and that inhabiting the *Concholepas*, Mr. Darwin stated that the main and unfailing character of a cirripede consists in the manner in which it becomes attached to foreign bodies. This is effected at first by the voluntary act of the larva, or more strictly pupa; afterwards a thick fluid or soft tissue debouches by the penultimate or ultimate segment of the prehensile antennæ, and so permanently attaches them to the surface: the antennæ are thus preserved, whilst all the other external organs of the pupa are moulted and lost. During the continued growth of the cirripede, the cementing substance in many genera is emitted from fresh orifices placed symmetrically round, but further and further from the centre of the basis. The most remarkable circumstance with respect to this cementing substance is that it is certainly secreted from glands which are actually continuous portions of the branching ovarian tubes or cæca. Finally, Mr. Darwin observed, that had Mr. Hancock examined specimens, instead of drawings, of the *Lithotria* in the rock, he would almost certainly have acknowledged its power of excavating cavities.—Prof. MILNE-EDWARDS suggested that the secretion by which the cirripedes were enabled to attach themselves to foreign bodies was produced by a gland at the base of the antennæ, similar to that which occurs in some species of macrourous Crustacea.—Mr. DARWIN in reply stated that the gland in the cirripedes was truly ovarian.—Prof. ALLMAN referred to the instance of a burrowing barnacle which had been discovered in the shells of some turtles brought from the West Indies, and described by the Rev. W. Hincks. It was a large species, measuring an inch and three-quarters.—Mr. JEFFREYS inquired if the cirripedes were in the habit of moulting.—Mr. DARWIN stated that their life was very active and their changes frequent, and some species moulted twice in a week.—Dr. MACDONALD thought that the structure of Mr. Hancock's animal and its earlier changes would throw some light on the structure of Trilobites.

'Notes on the Boring of Marine Animals,' by C. S. BATE.—The object was to prove that the perforations of certain mollusca and annelids into calcareous bodies were effected through the agency of "free carbonic acid held in solution by sea water;" the economy of boring animals being simple and uniform in their kind throughout creation, being only instruments directing the solvent more rapidly to a given point, this being done chiefly through the process of respiration and ciliary currents. He drew attention to the disintegration of limestone rocks when exposed to the long-continued action of the sea, and exhibited some rolled pebbles which, according to the character of perforation, he separated into three classes:—First, those penetrated by minute dichotomous holes, attributed to the power of certain annelids, previous to the pebble having been fractured from the solid rock. Second, in which the holes were externally cylindrical, but internally worn into many irregular channels, from having been originally perforated by annelids, which opened for the action of the sea a passage to the centre of the stone, which by continual rolling would give a fresh direction and a new impetus to the affinities existing between the corroding material and carbonate of lime, and consequently extensive internal excavation would be the result. Third, those having panned more or less through the two former stages, and become fixed and partially protected by accidental causes show not holes, but large, small and imperfect depressions.—The author's experience went to show that the power which *Saxicava* possess of boring rocks has been much overrated; he thought that their capacity to penetrate ceased while they are very young, that they bore only during the period that they possess a foot sufficiently strong for locomotion, after which excavation only continues adapted for their increasing growth. To show this, he pointed to the fact that whilst the entrance first made under the direct influence of the *Saxicava*

barely exceeds the sixteenth of an inch, that of the adult often equaled almost the diameter of the animal itself; it being a persistent rule that the external entrance increases in size in a corresponding ratio to the increasing thickness of the shell. He presumed that the Spongia Cliona perforated the valves of oysters and other mollusca by the aid of the same corroding power; that a spore first obtains a footing between the layers of the oyster shell by adhering and simply fulfilling the conditions of its existence according to the known character of these mysterious creatures. He mentioned that he had found a *Saxicava rugosa* deformed in its growth and turned from its direct line of progress by coming into contact with Cliona. He also exhibited an oyster-shell from which he had removed fifteen specimens of *Saxicava*; among them were two whose lines of boring were at right angles to each other, the consequence of which was that one bored into the side of the other until the creature whose shell was injured repaired the breach and protected itself from further injury by secreting a membranous substance similar to that of the epidermis. The animal not being full grown, and being unable to penetrate through the newly deposited membrane, is in consequence deformed, the more recent portion of the anterior extremity of the valves being flattened against the side of the opposing substance. The other, which crossed its path, had a portion of the matrix into which it bored projecting into the cavity so as to occupy a position between the ventral margin of the valves, pressing against the opening in the mantle where the foot protrudes. This specimen he considered valuable as affording evidence upon three material points:—First, it was opposed to the theory of mechanical attrition by the foot or mantle, since the greatest protuberance was formed in juxtaposition with them, and which is thus shown to be inefficient for the purpose. Secondly, it was unfavourable to the theory of an acid secretion, since its solution was weakest where its power should be most in action; and, lastly, it was opposed to that which presumes the animal to use its own shell upon the principle of an auger, since the presence of such an irregularity must preclude the possibility of either shell from moving ventrally forwards, consequently there can be no rotary motion. With regard to the Pholidide, he presumed that as far as the animal was concerned the action was the same, but the materials into which they bore being insoluble and very soft, wear by force of the much more powerful currents which this family have the power of exciting, although where they bore, into soft calcareous bodies the two forces will work in combination. He exhibited to the Section a drawing of a fragment of carbonate of lime of a reddish colour, from the cabinet of J. G. Jeffreys, Esq., which had been perforated by many mollusca and annelids, and which is changed from red to white, representing the chemical alteration of the rock from carbonate to a bicarbonate of lime. The writer alluded to the boring powers of the Gasteropoda, as also that of the family of the Purpuride, together with the absorption of the columella in the latter tribe.

Prof. MILNE-EDWARDS was willing to admit that many phenomena which had previously been attributed to the operation of annelids and small mollusca were, as Mr. Bate observed, the action of carbonic acid; but he wished to draw the author's attention to the fact that the greatest force of the currents were in a direction contrary to that in which the animal bored,—that while the excavation penetrated into the rock the currents passed out of the syphon.—Mr. BOWERBANK remarked that he could not see why Cliona should be presumed to have any power not belonging to sponges in general. Cliona was a true sponge, and he did not believe that the perforations which had latterly been attributed to it were the work of that animal. He had often found Cliona free; consequently boring was not its nature, and it was purely accidental when it occupied the channels of a previously perforated shell.—Mr. JEFFREYS said, in answer to Mr. Bowerbank, "that Cliona was sometimes found in a free state and not imbedded, and consequently it did not possess a perforating power;" that individuals of *Saxicava* were frequently met with under similar conditions, but the perforating power which they possessed was unquestionable.—Prof. FORBES wished to know if Mr. Bate had paid any attention to Mr. Hancock's theory, and whether

Mr. Bate had endeavoured to find the siliceous spicules asserted by Mr. Hancock to exist in the foot and mantle of these creatures.—Mr. BATE had endeavoured to find the spicules of which Mr. Hancock spoke, but without success, and he had arrived at the conclusion that what Mr. Hancock conceived to be crystalline spicules adapted to the purpose of rubbing, were in fact prisms of salt left by the evaporation of sea-water.—Prof. FORBES had, as also those who had assisted him in his researches, arrived at the same conclusion.—Mr. A. STRICKLAND said that the theory of a solvent was first propounded by Colonel Montague, and no doubt it was very ingenious, but such it only still remained; he did not believe that it was a solvent at all, particularly carbonic acid, which was a very weak acid.—Mr. TAYLOR said that if the excavation had been effected by a corrosive substance the surface should be irregular and not smooth.

'On the Luminosity of the Sea on the Cornish Coasts,' by C. W. PEACH.—The author described the state of the weather at the time of observation, comparing it with that which occurred soon after, as well as the animals observed on those occasions. He exhibited drawings of many, some new to the British coasts—one, at least, of which has been found in the Mediterranean. These were abundant in July, but were destroyed by a heavy gale of wind; since which they have not been noticed. They belong to the Diplydiæ. The author had a long list, arranged in a tabular form, of the animals, state of weather, date and hour of observation, the amount of luminosity, &c.; but we confine ourselves to giving the list of animals observed, with a table of the number of observations made in five years, and the changes of weather that took place soon after.—

Very Luminous.		When it
When the weather has changed suddenly from fine to wet, with gales of wind, and at times tempestuous, with lightning, &c.		continued fine.
1845	1	1
1845	1	1
1847	9	2
1849	13	4
1849	16	3

List of Objects observed.
"Gasteropoda—Young of *Eolis*. Tunicata—Tadpole of *Botryllus*. *Cirrhopoda*—Young of Barnacles, and cast skins. *Crustacea*—Opossum shrimp, *Zoea*, *Oniscus asellatus*, *Polychæna*, *Cyclops*, *Cypris*. *Annelida*—A small swimming Annelid. *Zooplysia*—*Laomedæa*, &c. *Aculephæ*—*Willisia stellata*, *Saphenia dinensis*, *Sarsia prolifera*, *Thaumantias octona*, *Thaumantias inconspicua*, *Bougainvillea nigritella*, *Lizzia blondina*, *Lizzia octopunctata*, *Beroë*, a new one, *Diplydiæ*, probably *Cuboides vitreus*, and one something like *Calpe pentagona*, both new to the British seas. Several other objects, much like the young of *Zooplysia*.

Prof. E. FORBES expressed the pleasure he had in again seeing Mr. Peach at the Association. The animals observed by him were very interesting. One of the animals described by Mr. Peach was new to the British coasts, but had been described on the French coasts. Another of the creatures supposed by Mr. Peach to be new was the hydroid state of a species of *Medusa*.

'On additional Bones of the Long-legged Dodo, or Solitaire, recently brought from the Mauritius,' by Mr. H. E. STRICKLAND.—The author exhibited specimens of bones, which were quite confirmatory of the views that he had previously taken of the structure and relations of this family of birds.

The PRINCE of CANINO stated that although formerly he had not agreed with Mr. Strickland, he now believed that he was correct, and that the Dodos were truly gallinaceous birds.—Dr. MACDONALD objected to the terminology used by Dr. Melville and Mr. Strickland in their account of the structure of the anatomy of the Dodo and its kindred.—Dr. GROSSHANS stated that the Dutch Government had given orders that search should be made in all their museums for any remains of the Dodo, or its kindred extinct species.

Mr. H. E. STRICKLAND read the 'Report of the Committee on the Vitality of Seeds,' and gave a list of the species which had been planted and had grown during the past year.

Dr. LANKESTER suggested, that as the committee had been now in existence nine years, they should draw up a Report of the results already obtained. The experiments amount now to nearly a thousand, and are quite sufficient to afford an examination for the purpose of ascertaining what were the conditions of the seed which enabled it most successfully to re-

sist the action of the vital force for varying periods of time.

SUB-SECTION.—ETHNOLOGY.

President—Sir C. MALCOLM.
Vice-President—Dr. HODGKIN.
Secretary—Dr. R. G. LATHAM.
Committee—Chevalier Bunsen, Mr. J. Crawford, Capt. Sir E. Belcher, Messrs. C. H. Bracebridge, A. R. St. Legor, J. Hogz, Dr. Beke, Rev. H. Milman, Rev. A. P. Stanley, Jr. Fowler, Prof. Milne-Edwards, Dr. Lane, Mr. F. Newman, Gen. M'Innes.

No meeting having been held on Thursday, the Section commenced its proceedings by a paper, 'On the Oriental Words adopted in English,' by J. CRAWFORD.—The following is a list, according to Mr. Crawford, of such words of Oriental languages as in comparatively modern times have found their way into our own tongue. The greater number will be found in Todd's edition of Johnson's Dictionary; and the rest, with few exceptions, in Webster's American Dictionary. The words that he has collected amount to 160,—and came to us, he says,—often indirectly, however,—from the Arabic, the Persian, the Turkish, the Hindû, the Malay, the Chinese, and the Polynesian tongues. Following this arrangement of languages, Mr. Crawford gave the list in alphabetical order for each class.—*Words derived from the Arabic*:—Admiral, Alchemist, Alchemy, Alcohol, Alcoran, Alcove, Alembic, Algebra, Alkali, Amber, Ambergris, Arab, Arabian, Arabesque, Arabic, Arrachi, Arack, Assassin, Barb, Cadi, Caliph, Chemistry, Civet, Chouse, Coffee, Coffin, Cotton, Damask, Damaskeen (damson), Dragoman, Faquar, Gallant, Gallantry, Hegira, Hookah, Hur, Huri, Islam, Lemon, Lime, Mahomet, Mameluke, Minaret, Mohair, Moslem, Musselman, Mosque, Nabob, Nadir, Naphtha, Nard, Spikenard, Olibanum, Opium, Orange, Otto of Roses, Ottoman, Ryat, Salam, Saracene, Saracenic, Scullion, Sherbet, Shrub, Sofa, Soldan (sultan), Sophy, Tabour, Tambourine, Talisman, Tamarind. We give a few of these derivations as examples:—*Admiral*. From *amir*, a noble, a prince, a commander-in-chief, and *bahar*, the sea or a fleet, with the article *al* prefixed. *Amir al bahar*, therefore, means commander of the sea or of the fleet. The word has evidently come into French from Spanish, and from French into English. In Spanish the Arabic is corrupted into *almirante* to express the commander, and into *almiranta* to designate the flag-ship. The *d* was added in English, probably from some notion of euphony. But originally the word, whether to express the admiral himself or the ship he commanded, was written as both are at present in French. For the flag-ship Milton writes the word *amiral*,—as when he is describing Satan's spear.—

His spear, to equal which the tallest pine
Heaven on Norwegian hills to be the mast
Of some great *amiral*, were but a wand
He walked with to support uneasy steps.

—*Alcohol*. *Al kahala* means the sulphuret or common ore of antimony, used by the Arabian women to blacken the eyelashes. According to the Dictionary of the Spanish Academy, the alchemists were in the habit of distilling this mineral along with ardent spirit,—believing that a highly concentrated spirit was the result; and hence the word alcohol, a corruption of *al kahala*.—*Alembic*. *Anbik*, a still, with the article *al* prefixed. The Arabs introduced the art of distillation into Spain, from whence it spread to the rest of Europe,—to which, until then, it had been unknown, either in ancient or modern times. It is singular enough that we should owe to a people who hold the use of spirits as unlawful and abominable the art of manufacturing them. It may be conjectured, from the use of such words as *cau de vie* and whiskey, a corruption of the Irish *nighe beatha*, meaning the same thing, "water of life," that spirits were probably first used medicinally, as opium was at first by the Chinese. The Arabs of Spain would certainly not have foreseen that in time a single Christian nation, and to them an obscure one, should one day draw a yearly revenue of seven millions from the discovery they had communicated to the Christians,—a sum far greater than the whole revenues of Spain in any one of the eight hundred years during which they occupied it.—*Chouse*. Persian, *Kiana*, intelligent, ingenious, astute. It appears that in Persia and Turkey this word is applied to certain public agents as an honorary title. Mr. Gifford, in a note to his edition of the works of Ben Jonson, (for it is to him I owe this very curious etymology,

says, "In 1609, Sir Robert Shirley sent a messenger or *chiaus* (as our old writers call him) to this country, as his agent from the Grand Signor and the Sophy, to transact some preparatory business. Sir Robert followed him at his leisure, as ambassador from both these princes; but before he reached England, his agent *chiaused* the Persian and Turkish merchants here of 4,000*l.* and had taken his flight,—unconscious that he had enriched the language with a word the etymology of which would mislead Upton and puzzle Dr. Johnson." There are some mistakes in Mr. Gifford's statement which may be corrected. Sir Robert Shirley certainly came to England very much at his leisure, for he did not come until seven years after the fraud committed by his agent. He could not have been deputed by the Grand Signor at all,—for the object of his mission was to stir up England and the other European powers to make war on the Grand Signor on behalf of the Sophy. But even the Sophy denied him, and sent a native ambassador to England to denounce him as an impostor. The *chiaus*, in fact, seems to have been simply a commercial agent for Sir Robert Shirley. The 'Alchemist' of Ben Jonson, in which the word first occurs, was first acted in 1610, the year following the commission of the fraud,—and the following is the dialogue.—

Dapper. What, do you think that I am a *chiaus*?

Facc. What is that?

Dapper. The Turk was here, as you would, do you think I am a Turk?

Facc. I will tell the doctor so.

Dapper. Do, good sweet captain.

Facc. Come, noble doctor, pray thee, let us prevail. This is the gentleman, and he is no *chiaus*.

The cheat, who in all probability was a Persian, it will be observed is called a Turk, for our forefathers were not particular in distinguishing Oriental people. Both people wore great turbans and both professed Mohammedanism,—and they used the name that was most familiar to them. At first the word appears to have meant a cosener or cheat; and this seems its natural sense. Dryden uses it as a verb, "to cheat, to cosen;" and Butler for the party cheated, a bubble, a tool, as in 'Hudibras,'—

A sottish *chouse*,

Who when a thief has robbed his house
Applies himself to cunning men.

—*Coffee.* Arabic, *kahwah*,—Turkish, *kahve*. The English word evidently comes direct from the Turkish. The coffee plant is a native of Abyssinia, and not of Arabia,—for it was not known at Mecca until 1454, only forty years before the discovery of America. The true name of the plant is *ban*,—and *kahwa*, or coffee means "wine," as a substitute for which the decoction was used, although the legality of the practice was long a subject of dispute by the Mohammedan doctors. From Arabia it spread to Egypt and Turkey, and from the last-named country was brought to England in 1650. In sixty years time it was familiarly known, at least in fashionable society, as we find from Pope's well-known lines in the 'Rape of the Lock.'—

Coffee, which makes the politician wise,
And see through all things with his half-shut eyes.

—*Nabob.* *Nawab*, the plural of *naib*, a deputy or lieutenant; but in the popular language of India, from which the word has come to us, the plural is used for the singular. Sir T. Herbert, whose travels were published in 1634, spells the word *nabobb*, and defines it, "a nobleman in the language of the Mogul's kingdom, which hath mixed up with it much of the Persian." The bad orthography, therefore, is of old standing; but when the word began to be applied to a wealthy man returning from India I do not know. Probably, however, it was shortly after the conquests of Clive, now near a century ago. Seventy years back it was, at all events familiar enough in this sense, as may be judged by the following epigram on Sir Thomas Rumbold, ascribed to Charles James Fox. Sir Thomas is supposed to have begun life as shoe-black at Arthur's Club, of which the ruling waiter was one Robert Mac Grath. He went afterwards to India, rose to be Governor of Madras, and was dismissed from office in 1781.—

When Mac Grath reigned o'er Arthur's crew,
He said to Rumbold, "black my shoe."
And Rumbold answered, "ya Hob."
But now returned from India's land
He proudly scorned the base command,
And boldly answers, "Nabob."

Before quitting the list of Arabic words, Mr. Craw-

furd said it might be noticed that the Arabs had effected, although in a rude way, far more than the Greeks and Romans towards making the eastern and western worlds acquainted with each other and communicating arts and knowledge. These (until inspired by the fanaticism of a new religion) house-keeping barbarians pushed their religion, arms, arts, and trade within thirty years to the western confines of India, and in eighty-eight years to Spain. They pushed their commerce to China and the remotest islands of the Indian Ocean,—which neither Greek nor Roman had ever reached. We owe to their fanaticism cotton, coffee, the sugar-cane and culture of sugar, paper, arithmetical notation, race-horses, the whole citron or orange tribe of fruits, and all the various products of distillation.—From the Persian and Turkish languages there are,—Bashaw, Can, Caravan, Caravansary, Dervise, Emerald, Fairie, Hindu, Hindustan, India, Indigo, Jackall, Janizary, Jasmine, Lac, Lacker, Mogul, Musk, Satrap, Scimitar, Sepoy, Seraglio, Shawl, Semindah, Senanah, Tartar, Turband, Turk. We take as an example—*Sepoy*. Persian, *sapahi*, a soldier, from *sapah*, an army. We have two forms of this word in English. We write the word *sepooy* when applied to an Indian soldier, and *spahi* when it applies to a disciplined Turkish soldier.—From the Indian and Hindu languages there are—Araca, Avatar, Bamboo, Banian, Betel, Bramin, Camphor, Caste, Chintz, Chop, Cooly, Cowrie, Cubeb, Curry, Crone, Gentoo, Lac, Madapollams, Masulipatan, Mullagatwainy, Muslin, Palanquin, Raja, Rupee, Sandalwood, Sugar, Suttee, Talapoin, Teak, Toddy. We take as an example the last.—*Toddy*. This word for a mixture of spirits and water, appears to be taken from the Indian word *tari* or *tadi*, pronounced toddy by Europeans,—the sap or wine of a palm.—From the Malay are—Babigroussa, Bankshall, Bantam, Bird of Paradise, Caddy, Cassiowary, Catechu, Cockatoo, Compound, Creese, Gambir, Gambago, Godoron, Gutta-purchase, Japan, Junk, Loory, Mango, Mangostin, Musk, Orang-outang, Paddy, Pical, Prow, Ratan, Sago, Sapanwood, Shaddock, Tahl, Upas. We select,—*Caddy*. A small box for holding tea. This is very probably a corruption of the Malay name of a Chinese weight, being the hundredth part of a *pikal* or man's load, and reckoned at a pound and a third avoirdupoise. The name of this weight is *kati*, usually written by Europeans *cattie* or *catty*. Fine tea in small boxes of this weight used to be imported.—*Orang-outang*. Malay, *oran-utan*, literally man of the forest, but more correctly a rude or uncivilized man, a savage, a clown, a rustic. The accent, as in nearly all Malay words, is on the penultimate in both words, and not, as we make it, on the last syllable. The naturalists, taking the Bornean individual as the type, establish a class of monkeys under the name of *Ourangs*; but the propriety of the term is very questionable indeed,—seeing that *orang* means a human being, and is translated by the Latin word *homo*. The name of orang-outang for any kind of monkey is unknown to the Malays,—and the natives of Borneo call the animal *mias*.—From the Chinese are—Bohea, Congou, Hyson, Mandarin, Nankin, Soy, Tea. The number of these is small, owing to the imperfect monosyllabic dialects of China,—which do not, of course, find a ready way into our polysyllabic language. Nearly the whole foreign trade of China is carried on in a jargon of English.—From the *Polynesian*, Mr. Crawford finds but three words in general acceptance:—*Kangaroo*, *Taboo*, and *Tattoo*. We take,—*Kangaroo*. This word has found a place in our dictionaries, and was certainly supposed to be an Australian word by Capt. Cook, who first used it and described the strange animal to which it is applied,—yet it is strange that no such term is to be found in any Australian language.

'On Tumuli in Yorkshire,' by Prof. PHILLIPS,—being an account of an examination of some tumuli in Leicestershire and Yorkshire.—Prof. Phillips prefaced his remarks with a few observations. What he was about to say would, he hoped, point out a manner in which the more curious might employ themselves usefully in augmenting the data, of which there were at present very few, with reference to the classification and distinction, by means of cranial observations, of the race of men whose remains lie within those tumuli. In prosecuting inquiries with a tendency to throw light on such a subject, it was

necessary to notice the affinities of nation and the affinities of language. The latter was of general interest, but with respect to the former in comparing the external physiology, the physical relations of mankind with one another, curious inquiries arose. As the peculiarities of physiology of different nations remained at present as they had been described by early historians, they might conclude that the physical characteristics of mankind were of an enduring character; and it was by this fact that in endeavouring to distinguish the various nations who had inhabited this country they would be mainly assisted. The late Dr. Richards perceived the importance of this; and this had induced him to turn his attention to the subject. He thought it a matter of the greatest importance to be able to determine, by means of the conformation of crania exhumed from tumuli, the nation, historically speaking, of which those crania were characteristic. Dr. Richards, in a communication to him shortly before his death, had attached much interest to the circumstance of being able to procure a true British cranium. He (Prof. Phillips) thought that by directing attention to the tumuli existing in Great Britain, a considerable number of crania of British races, and of the Anglo-Saxon era, might be procured, which, in the manner he had pointed out, might be distinguished from those of the Danish, Norman, and other invaders of our soil. Prof. Phillips, then, with the aid of a diagram, showed the position of a considerable number of tumuli in Yorkshire, on a dry elevated tract of chalky land in the West Riding. He also gave an account of the opening of one of them by himself and a friend, and of the appearances which presented themselves. Near the surface they discovered a heap of burnt human bones and a curious bone instrument, but at the base of the tumulus the skeleton of a man sitting in an upright position with an urn placed between his arms and legs. The urn was of the most simple description, being composed of clay rudely ornamented. The skull was, however, apparently a malformation. He had not drawn any particular inferences from this isolated case, but he merely stated the result of his investigations,—being convinced that by calling attention to such facts, if they were systematically and zealously pursued, considerable light might be thrown on this subject.—At the conclusion, Messrs. KENDRICK, CRAWFORD, CLARKE, MAC ADAM, and WANSEY made a few observations on what had fallen from Prof. Phillips.

SECTION F.—STATISTICS.

'On the Diseases and Causes of Disability for Military Service in the Indian Army,' by Dr. FINCH.—The native soldier is not subject to a variety of diseases incidental to the European, and many of the complaints common to both are less severe, less complicated, and less fatal in the Indian, from physical constitution, simple nature of his food, and regular and temperate habits. He is, in a great degree, exempt from many of the acute, febrile, and inflammatory disorders so fatal to the European within the tropics. There is a marked difference in the character of the complaints common to both—those of the native being of the asthenic, and those of the European being of the sthenic diathesis. In the Asiatic, though there is a less tendency to a rapid course, there is less vigour to resist the encroachment of disease, which exhibits a proneness to become chronic and inveterate, occasionally terminating more tardily, but not less certainly, in death. This inferior power of the constitution renders them more prone to disease under slight exciting causes, less able to bear active depletory measures, or on the invasion of disease in an acute form they sink so rapidly that the mortality in the two classes is in a great degree equalized. From this inferior power of rallying from the attacks of disease, many disorders which at their commencement are acute become in their progress chronic, and terminate in rendering the native soldier incapable for service. In order to ascertain the particular diseases which incapacitate the Sepoy, and their relative frequency, it may be deemed requisite that an examination should be made, on a comprehensive scale, of the invaliding rolls, which, besides containing a statement of the numbers, enumerate the diseases and causes of disability. On inquiry, I find no such documents are procurable in this country; hitherto mere numerical returns have been made

to the India House. In the absence of more extensive returns, I have been obliged to satisfy myself with the results of a more limited examination, but which will afford a close approximation to a knowledge of the real causes of disability, and enable us to form an estimate of their relative frequency. I have submitted to examination the invaliding rolls of three regiments for a period of nine years—from 1834 to 1842. These rolls are of the men presented for examination belonging to the 31st, 40th, and 57th regiments of Native Infantry on the Bengal establishment. Undoubtedly, there are many circumstances which have a temporary as well as a permanent influence on the health of corps. The chief of these are climate, locality, and nature of the duties required of the men. By a fortunate coincidence, arising from a diversity in the course of their service during these nine years, I am enabled to give illustrations of the effects of these agencies. The 31st had lately returned from service in Afghanistan. The 40th had within the period selected completed three years' service to the eastward, at Kyak Phyon; and the 57th had returned from Barrenpore, after a triennial residence at that unhealthy station. By a reference to the general table exhibiting the numbers invalided, we find the following results:—That there were invalided for susceptibility to fever 5, and general debility, a frequent consequence of fever, 24; enlargement of the spleen, induced by fever, 3; or from fever and its consequences, a total of 32. That there were transferred from these regiments for rheumatism and contractions of the joints, a common consequence of rheumatic disease, no fewer than 68. That there have been incapacitated by asthma no fewer than 28; by dyspnoea not less than 6; and by consumption, 1;—from pulmonary disease altogether, 35. Disqualified by diseases of the eye, cataract, ophthalmia, and amaurosis, 14. Invalided from diseases of the brain, apoplexy, mania, paralysis, and epilepsy, 13. There have been rendered non-effective by bowel complaints, by diarrhoea, 3; by dysentery, 5;—total, 8. Diseases affecting the whole system, such as scrofula, leprosy, syphilis, and cancer, 9. 8 have been removed from disability affecting the bones; 3 from fractures; and a similar number from loss of teeth. Exostosis 1, and periostitis 1. Incapacitated by diseases of the extremities there have been 13; 5 by wounds, of which 2 were received on service; by ulcers, 1; and by a peculiar disease, called "burning in the feet," 6. From cutaneous affections, 3. The other causes of disqualification, either accidental or anomalous, such as hernia, hemorrhoids, &c., 25. During the nine years stated, 54 men have been incapacitated by general infirmity, or having become unfit—in fact, "worn out." An abstract of the general tabular statement shows as disqualified for further service, 282—equivalent to 91 from each corps in this period, or 10 annually; and taking the strength of a native regiment to be 800, we have a rate of $\frac{1}{8}$ per cent. It appears by the list that 54 men have retired from being worn out in the space of nine years. This class included all men who, by reason of their age or length of service, have become unfit for further duty. It is worthy of inquiry to ascertain what are the average periods of life and service at which the native soldier becomes incapable of further duty. In following up this inquiry, it will be necessary to ascertain the averages of ages and service of the several grades separately; for were the ages and periods of service of all ranks to be taken collectively in forming an estimate of the mean age or service of those who have been declared "worn out," it would be by no means a just one. Some of the native commissioned officers serve upwards of 40 years, and are beyond 60 years of age at the period of their transfer to the invalids. By including their ages and periods of service in striking an average, we should obtain one obviously too high. It is therefore necessary to subdivide the men invalided from having been worn out into three classes, according to the several grades they were in when transferred, viz., commissioned officers, non-commissioned officers, and privates. The higher rate of pay, the lighter duties, and the superior pension, induce the native commissioned officers to hang on for a longer period than they would have done had they been in the inferior grades, and even to require a little gentle persuasion to present themselves to the Invaliding Commissioners when no longer fit for duty. The same ad-

vantages, though in a lesser degree, may have their influence on the minds of the non-commissioned, and induce them to continue in the ranks a few years longer, though, as far as regards pension or duty, there is no difference between the grades of non-commissioned officers, the Naicks and Havildars. Not having attained to these benefits, the Sepoy or private has no great inducement to remain longer in the service than he possibly can; and if he sees no immediate chance of promotion to the next grade, is anxious to exchange the active duties of his condition for the ease and comfort of retirement, and accordingly exaggerates his disability. These considerations have their weight, and may account for the comparative numbers of the several ranks, and the relative ages and periods of service of those who are annually removed. These remarks do not apply exclusively to those who are declared "worn out," but to all pensioned, whatever may have been their disqualifying causes for military duty. There have been 14 commissioned officers pensioned in the period we have submitted to examination; their average age is 58 years 2 months, and their length of service 38 years 3 months. 25 non-commissioned officers have been transferred in the same time to the invalid establishment from these three corps, of whom the average age is 47 years 8 months, and their length of service 26 years 6 months. During the nine years 11 Sepoys have been struck off the strength of these three corps, having been declared "worn out" after a service of 24 years 8 months, and at an average age of 44 years 8 months.

Table exhibiting the Diseases and Causes of Disability of the Men invalided from the 31st, 40th, and 57th Regiments, N.L., during the Nine Years from 1834 to 1842 inclusive.

Classes.	Specific Diseases.	31st	40th	57th	Total
Diseases of the brain—	Paralysis	1	2	2	5
	Epilepsy	3	..	3	6
	Mania	2	..	..	2
Of the eye—	Cataract	2	2	..	4
	Ophthalmia .. ..	..	..	1	1
	Vision impaired .. ..	..	3	6	9
Of the ear—	Deafness .. ..	..	..	1	1
	Asthma	13	9	6	28
Of the chest—	Dyspnoea	1	5	..	6
	Phthisis	1	..	..	1
	Heart enlargement .. ..	..	1	..	1
Of the abdomen—	Diarrhoea	2	..	1	3
	Dysentery	3	2	..	5
	Spleen enlargement	1	2	..	3
Of joints—	Contraction	1	..	2	3
	Dislocation .. ..	..	1	..	1
	Rheumatism	21	30	14	65
Of the extremities—	Ulcers	1	..	..	1
	Wounds	2	2	1	5
	Varices .. ..	..	..	1	1
Of the bones—	Burning in feet .. ..	..	1	5	6
	Exostosis .. ..	..	1	..	1
	Fractures	1	2	..	3
Of the skin—	Periostitis .. ..	..	..	1	1
	Toothless .. ..	..	..	3	3
	Anomalous	1	..	..	1
Of the system—	Ichthyosis	1	..	..	1
	Leprosy .. ..	..	..	1	1
	Scrofula	1	1	2	4
Other diseases—	Leprosy .. ..	..	..	6	6
	Syphilis	1	..	..	1
	Cancer	1	..	..	1
Accidents	Accidents	4	1	..	5
	Anomalous	1	..	3	4
	Debility	11	2	11	24
Defective speech	Defective speech .. ..	..	1	..	1
	Doubled hand .. ..	..	..	1	1
	Fevers .. ..	..	5	..	5
Hemorrhoids	Hemorrhoids	1	1	1	3
	Hernia .. ..	..	3	..	3
	Hydrocele .. ..	..	1	..	1
Malignancy	Malignancy .. ..	..	1	..	1
	Testicle swelled .. ..	..	2	..	2
	Worn out	27	11	16	54
General total		103	92	87	282

Annexed to the paper are the 'Vital Statistics of the East India Company's Armies in India,' by Col. SYKES; and in Vol. iii. of our Transactions are tabular statements of the transfers and casualties on the invalid pension establishment; of the average length of service before transfer; average age at period of

disease, and number of years each grade remained on the pension list for the years 1843 and 1844-5 for Bengal, and for Madras for the years 1842-3 and 1843-4. These statements include the whole native force of the Bengal and Madras Presidencies during the years specified, and offer, on an extensive scale, an opportunity of comparing the average periods of service and ages therein stated with those of the men invalided in the three native corps whose rolls have been submitted to examination. It will be seen that there is a close approximation in the averages stated at which the men of these regiments were transferred to the invalid establishment, and the periods mentioned in the tabular statements referred to. The average period of service before transfer of the two grades of commissioned officers in the Bengal Presidency was, in 1843-4, 38 years 2 months 5 days, and in 1844-5, 38 years 10 days. The average age of the commissioned officers was 56 years 4 months in 1842-43, and 51 years in 1844-5. The average age of non-commissioned officers was 47 years 6 months in 1843-4, and period of service before transfer, 27 years 9 months 18 days. The average period of the native soldier, or Sepoy, previous to transfer, was 16 years 10 months 4 days; and his age at date of transfer was 42 and 41 years respectively, for the years 1843-4 and 1844-5.

'On the Production of Sugar in India,' by Lieut. Col. SYKES.—This paper, which was of great length, contained some contributions to the statistics of the production of sugar in British India, which the Colonel had compiled from a parliamentary document recently issued. He detailed the varieties of sugar cultivated in India, the amount raised and imported, the price of labour and cost of production, &c. In illustration of the fact that the consumption of sugar in England was contingent on its price, he mentioned that while in 1836, when the price was 64s. 9d. per cwt., the consumption averaged 16 lb. per head per annum, in 1848, at 36s. 4d. per cwt., it amounted to as much as 25 lb. per head. The consumption by the people of India, contrary to the general opinion in this country, was much smaller, varying as it did from 2½ lb. to 9 lb. per head. Col. Sykes was of opinion that British subjects in India had nothing to fear from the asserted ruinously low price which was obtained for sugar; and he could not see why free labour produce might not successfully compete with that of slave labour.

The BISHOP OF OXFORD, Mr. SLANEY, Mr. PORTER, Mr. J. STURGE, and Mr. HEYWOOD, took part in a conversational discussion which followed, and they appeared generally to concur in the conclusions at which Col. Sykes had arrived on the subject of competition between slave and free labour produce. It was admitted, however, that proprietors must personally look after their property more closely than they had hitherto done, to enable them to cultivate with any large amount of profit.

'On Prussian Statistics,' by Chevalier BUNSEN.—Chevalier Bunsen made a statistical statement of the proportions of the races in Prussia, and on the railroads and schools of that country. His information was chiefly derived from the 'Statistischen Tabellen des Preussischen Staates,' by M. Dieterici, the head of the Statistical Bureau at Berlin, and from private information supplied by the same gentleman. We give a few of the points of this communication. In 1843 Prussia had, including Neufchâtel, 15,536,734 inhabitants. It therefore ranks fifth as to population of the European States. From Dieterici's tables we find the population of the great States was as follows:

European Russia, with Poland	54,762,207
Austrian empire	35,877,964
France	34,230,178
England	26,891,517
Prussia	15,536,734

Prussian Germany contains 1,940,000 Slavonic inhabitants. There are in the world 42,000,000 who speak German. In the United States, 4,750,000 of Germans, or their immediate descendants, in Pennsylvania, 49 per cent. are German. In Prussia a census is carefully taken every third year. In 1815 Prussia had 10,250,000 inhabitants. The increase of population from 1815 to 1849 is 6,250,000: this is equal to the population of Belgium and Denmark. This increase is greater than in any other part of the Continent. Prussian statistics do not afford a confirmation of the theories of Malthus. Of the increase, 20 per cent. is from immigration,—the emigration to

America being deducted. The chief emigration has been from the neighbourhoods of Minden and Trèves. In 1815, Berlin contained 150,000 inhabitants; in 1848, 420,000; in 1849, 11,000 less. Of the population, 4,500,000 are inhabitants of towns. In Prussia, there are to every 100 males 103 females; in France, 104. More boys are born than girls. In the earlier periods of life, males are to females as 100 to 99. The standing army of Prussia is 137,000; men capable of bearing arms, 837,000. In 1843, of 4,500,000 women, 2,200,000 are unmarried, or rather without husbands, as widows are included. The average age of marriage for women is from 20 to 21; for men, 25 to 26. Protestants are to Roman Catholics as 5 to 3; Jews number 206,500. The conversions of Jews were from 100 to 150 a-year; but since their disabilities were removed, the conversions have increased 50 per cent.

An interesting discussion followed, in which Sir R. H. INGLES, the Earl of HARROWBY, the Bishop of OXFORD, and other gentlemen, took part.

MONDAY.

'On a Form of Table for collecting Returns of Prices in Ireland,' by Prof. HANCOCK.—The primary object of the table is to direct attention to the observation of the facts which give the most correct indications of the state of the poorer classes. The statistical investigations which have been hitherto instituted into the condition of the population have been too much directed to quantities, whilst the more important observations of values have been neglected. Thus we have the census taken in Ireland in the most elaborate manner, showing, not only the number of the population, but the number of the trees, the number of the cattle, and even of the poultry, in the country. Then we have returns showing the sizes of farms; and the agricultural returns, showing the number of acres under cultivation for different kinds of crops. Now, I do not propose to undervalue these investigations; but as long as these returns are not accompanied by returns of prices, the partial knowledge deduced from them is likely to mislead. Thus, the most mistaken propositions have been stated as to over-population, from considering the population tables without reference to the rate of wages. Specious theories have with equal boldness been put forward as to the size of farms, from considering the land returns without any reference to the rent obtained from farms of different sizes. As to capital, again, we have had the boldest assertions respecting its want or abundance, arising from a consideration of the quantity of money in circulation, the deposits in the savings' banks, or some other quantity of capital, without any reference to the rate of profit. In like manner we have been told that there is no hope for a nation which lives on potatoes, or that the salvation of Ireland depends on the introduction of green crops, or of flax, without any scientific investigation of the average prices of such crops, or of the rent which they will produce. But economic science teaches us the real facts from which the condition of a population can be ascertained, and the advantage of different systems of management compared; and this table is constructed for the purpose of having these facts observed. If we want to compare the condition of the labourer in Connaught with that of the labourer in Ulster, in Scotland, in England, or in America, what do we require to know? Why, two sets of facts. First, what are the money wages or price of labour in Connaught as compared with the money wages or price of labour in one of the other places. Secondly, what are the prices of the commodities consumed by the labourer in Connaught as compared with the prices of the same commodities in other places. From these we can at once determine the relative condition of labourers at different places at the same time; and by similar investigations we can compare the condition of the labouring classes at different times in the same place. Thus, if we ascertain that the average price of agricultural labour is in Connaught 6d., in Ulster 10d., in Scotland 1s. 4d., in England 1s. 8d., and in America 3s., whilst the prices of the commodities consumed by the labourer do not, on an average, rise in the same proportion, we see at once that the labourers in America are better off than those in England, who are again better off than those in Scotland, whilst the Scotch are better off than the Ulstermen, and they than the Connaughtmen. But

the observations for which the table is constructed would, if systematically pursued, serve a scientific purpose of far greater importance. They would enable us to perfect the principles of economic science, and place them on a firm and lasting basis, by applying to them, more extensively and systematically than has been hitherto done, the inductive method of reasoning which has led to such wonderful results in the natural sciences;—for observations of changes in values and prices are to the economist what observations of the movements of the heavenly bodies are to the astronomer—at once the facts to be explained, and the facts by which the truth or falsehood of his theories can be tested. The following is the form of the table:—It is headed with the name of the place where the observations are made: as the prices of different articles of wealth vary from place to place, it is necessary, in all observations of prices, to note the place where the observations are made. Then, the prices to be observed are divided into six classes:—1. The price of labour, or rate of wages; 2. The price of the use of capital, or rate of profit; 3. The price of the use of land, or land-rent; 4. The price of food; 5. The price of fuel; 6. The price of other agricultural produce. Under each of these heads a sufficient number of kinds of each class are selected to be observed. Thus, under the first class we have—1. Agricultural labourers; 2. Weavers; 3. Carpenters; 4. Smiths; 5. Tailors; 6. Men servants; 7. Women employed in agriculture; 8. Semptresses; 9. Spinners; 10. Women servants. In the second class, price of the use of capital, or rate of profit, we have—11. Interest charged by money-lenders to the poor; 12. Interest charged on bills above 20l.; 13. Cost of erecting a single-roomed cabin; 14. Rent of a single-roomed cabin. In the third class we have—15. Land let to yearly tenant; 16. Pasture land; 17. Building ground; 18. Conacre; 19. Tenant-right or good-will. For the fourth class we have—20. Flour; 21. Oatmeal; 22. Indian meal; 23. Potatoes; 24. Turnips; 25. Mutton; 26. Pork; 27. Fowls; 28. Eggs. For the fifth class—29. Coals; 30. Turf. For the sixth class—31. Flax; 32. Hay. Then, for the price of each article, there are two prices to be observed, viz., what is ordinarily considered a high price, and what is ordinarily considered a low price; and the table is constructed to have these observations kept for a period of six months, the prices being observed once a month. These tables are now in the hands of parties in Ireland, who are making observations.

'On the Tenure of Land in the Island of Madeira,' by Dr. PEACOCK, Dean of Ely.—[We postpone our report of this paper till next week, that we may have the author's own reading of one or two doubtful points in the manuscript.]

'On the Application of Statistics to the Investigation of the Causes and Prevention of Cholera,' by Prof. ALLISON.

This led to a discussion in which Prof. PLAYFAIR and Dr. HODGSON took part. The former pointed out various instances, in which, although there was no visible appearance of filth where the disease had manifested itself, that facts had subsequently come to light showing that this had been the cause, as for instance, the accidental discharge of a sewer out of a conduit pipe which had been known to produce the discharge in a very aggravated form. Dr. Hodgson remarked with reference to the infectious character of the disease, that this was a somewhat doubtful problem, inasmuch as instances had been known where washing the linen of parties who had been infected had produced contamination, whereas in others, at Tooting for instance, in 1832, this caused no ill consequences.

'On the Statistics of Monte de Piété and Pawnbroking,' by Prof. HANCOCK.—"In the course of some investigations into the condition of the poorer classes in Ireland, my attention was directed to the state of the trade of lending money amongst them. I found that whilst the large farmers resorted to regular banks to make deposits and obtain loans, there were no banks established by private enterprise for the smaller farmers and the labourers. They were forced to carry their deposits to charitable savings banks and obtain their loans from charitable loan funds at 9½ per cent., or else resort to local usurers at from 25 to 100 per cent. An inquiry then naturally suggested itself as to the cause of this difference. Why had private

enterprise not done for the poor what it had done for the rich? The common theory which ascribed the rate of interest charged to the poor to a want of capital was manifestly fallacious, for such a cause would raise the rate of the interest to the rich as well as to the poor. The cause of the phenomena to be explained must be something peculiar to loans of small sums, and especially to loans to small farmers. Such a cause soon appeared from an examination of the state of the usury laws. For in all the recent suspensions of the usury laws, contracts for loans under 10l., or on the security of land were left under their operation, so that it is illegal to charge more than 6 per cent. on such loans. The remnant of the usury laws by making the trade of lending money to the poor illegal, made it disgraceful, and by preventing the foundation of banks of discount for the poor prevented by the same means the establishments of banks of deposit for them, since the rich have banks of deposit because they have banks of discount. From this line of investigation I was led to consider the state of the law respecting pawnbroking, and the results of the attempt to interfere with that trade by the system of Monte de Piété or charitable pawnbroking. The restriction of the Usury Law, which prohibits money-lenders from charging more than 6 per cent. on loans of sums under 10l., is placed in a very absurd point of view when we contrast it with the legislation respecting pawnbroking. It is a well-known principle that the rate of interest depends to a considerable extent on the risk run by the borrower. The greater the risk the higher the rate of interest. Now, it is manifest that a man who lends on the mere credit of the borrower runs a greater risk than he who lends on the deposit of an article of the full value of the loan and interest. Yet, according to law, the rate of interest allowed to pawnbrokers in the latter case is always more than four times, and for some sums more than ten times, the rate allowed in the former case. Thus, the rate of interest fixed by statute for pawnbrokers in Ireland is 4d. per calendar month for every 2s., in lieu of all interest, warehouse-charge, and expense of safe-keeping. But ½d. a month is 6d. a year, and 6d. a year on 2s. is 25 per cent. Thus, pawnbrokers' interest is allowed to be above 25 per cent. per annum for all sums under 10l. But the month in which the loan is redeemed is to be added if more than three days have elapsed. Again, any money above 1s. bears the interest of 2s., and above 2s. the interest of 4s., and so on. Besides this, there is a charge allowed for duplicates, of 1d. if the loan be not above 10s., 2d. if above 10s. and not above 40s., and 4d. if above 40s. The period for which goods are usually pawned may be estimated from the time when the pawnbroker is allowed to sell the pledges,—viz. not above 20s. six months, above 20s. and not above 40s. nine months, above 40s. a year. Taking the halves of these respective periods I have calculated the rate of interest which pawnbrokers are allowed by law to charge for the following sums.—

	Ireland.	England and Scotland.
£ 0 1 1	85 per cent. per annum.	46
0 1 2	"	43
0 1 3	"	40
0 1 4	"	37½
0 1 8	"	30
0 2 0	"	25
0 2 1	"	24
0 2 8	"	"
0 4 0	33½	"
0 4 2	44	"
0 6 0	30	"
0 10 0	23	"
0 15 0	31	"
1 2 0	28	"
1 10 0	26½	"
2 0 0	26	"
5 0 0	25½	"
10 0 0	25½	"

Now, when there are 447 pawnbrokers in Ireland, lending about 2,000,000l. on 14,000,000 tickets,—in other words, on loans on an average less than 3s., at a rate of interest, consequently, on an average exceeding 41 per cent.—can there be anything more absurd than to enact that it shall be illegal to charge more than six per cent. on loans under 10l. without pawns, and to call any person who charges above that rate an extortioner, and cruel and hardhearted? Some persons have alleged that the rates of interest which pawnbrokers are allowed to charge are exorbitant. If this statement be true, the best remedy would be to leave the trade in money perfectly free, and

then the competition of money-lenders would reduce the rate of discount, whether on deposits or on personal security, to the lowest possible amount. But there are two circumstances which indicate that this rate is not so excessive as it seems to be:—first, the effects produced by the lower scale allowed to be charged in England and Scotland;—secondly, the failure of the *Monts de Piété* establishment in Ireland, for the purpose of lending on pawns on more favourable terms than pawnbrokers. In England and Scotland the pawnbrokers are not allowed to charge more than 1d. per calendar month for any sum under 2s. 6d. without any charge for the ticket. This makes the rate per cent for the sums under 2s. 6d. from 20 to 40 per cent. lower than the rate allowed to be charged in Ireland.

	England and Scotland.	
Time for 1s. 1d.	65	46
" 1s. 2d.	71	43
" 1s. 3d.	66	40
" 1s. 4d.	62	37
" 1s. 5d.	50	30
" 2s. 0d.	41	25
" 2s. 1d.	64	24
" 2s. 6d.	53	20

The consequence of the restrictions in England and Scotland is that the regular pawnbrokers refuse the great majority of pawns under 2s. 6d., comprising, we have seen, the largest class of Irish pawns. The demand for such loans, however, has created a set of unlicensed pawnbrokers, who systematically violate the law, and who are called in London "dollyshop-keepers," and in Glasgow "wee pawns." The trade carried on by these parties is limited by the odium attending their operations; the poor are consequently charged much higher sums than they would be if there was free competition. It may be interesting to notice the manner in which these parties evade the law. The dollyshop-keepers nominally purchase the article from the borrower, with a tacit agreement that if the latter come back in a month or six weeks at farthest, he will get back his goods on paying the sum lent and a bonus. I have been informed by an intelligent gentleman, who inquired into the matter, that there are in London more dollyshop-keepers than regular pawnbrokers. He estimated the former at 500, and the latter at 400. I am informed by the same authority that in Glasgow the trade carried on by the "wee pawns" exceeds by one-half the entire trade transacted by all the licensed pawnbrokers, their number being 1,500. Some further information on this subject is contained in a paper read before the Statistical Section of the British Association, at the Meeting at Glasgow, by Mr. H. J. Porter:—"There exists in Glasgow a system of pawning quite new to me," he says, "and I believe wholly unknown in Ireland. These are called wee or little pawns. I regret to say that the evils of the system are neither few nor little. The supposed advantages or inducements to pawn at these dealers are as follows:—1. They give money on articles of less value than the licensed pawnbrokers will receive. 2. They give about 2s. 6d. on articles which at licensed pawnbrokers will produce but 2s.; this is 25 per cent. more on the deposits. 3. They are open earlier and later than the usual pawnbrokers. 4. There is one of these houses opened on the Sabbath, both for pawning and releasing, which is kept by a Jew in Gibson's Wynd, or Princes Street. The manifest disadvantages are:—1. That they give no tickets, and consequently there is no security. They pretend to effect a purchase of the article, and although the poor person is under the impression that the article is still their own, yet in cases of dispute which come before the police authorities, these illegal pawnbrokers almost invariably contrive to prove that there has been a *bona fide* purchase and sale of the article. 2. The time for redeeming these pawns is one month, instead of one year. 3. The interest charged is 1d. per week for 1s. or at the rate of 43½ per cent. per annum." Now it is very remarkable that it never occurred to Mr. Porter to inquire why the wee pawns existed in Scotland and not in Ireland. Had he done so he would have readily discovered that their existence in Scotland arose entirely from the state of the law there. This discovery would have shown him that both the advantages and disadvantages of wee pawns are the offspring of restrictive legislation. As to the alleged advantages:—1d. They give money on articles of less value than

the licensed pawnbrokers will receive, because the law does not allow the licensed pawnbroker in Scotland to charge on very small sums a rate of interest that will remunerate him, the rate being from 20 to 40 per cent. lower than what is allowed to be charged in Ireland. 2nd. They give about 2s. 6d. on articles which at licensed pawnbrokers will produce but 2s. This arises from the act of Parliament providing a scale of remuneration for pawnbrokers which increases as the sum lent diminishes; thus, a pawnbroker in Scotland lends on an article 2s. 6d., he makes only 20 per cent.; 2s. 1d., 24 per cent.; 2s., 25 per cent.; 1s. 8d., 30 per cent.; 1s. 4d., 37½ per cent.; 1s. 3d., 40 per cent.; 1s. 2d., 43 per cent.; 1s. 1d., 46 per cent. It is his interest, therefore, to lend as small a sum as possible on each article. He would lose 5 per cent. if he advanced 2s. 6d. instead of 2s. on an article. As to the third alleged advantage, that the wee pawns are open earlier and later than the usual pawnbrokers. This arises entirely from the Act of Parliament which limits the hours of opening and closing pawn offices. I have not looked what these limits are in England and Scotland; but in Ireland the taking of a pawn before 10 o'clock from March to September, and before 10 or after 4 o'clock from September till March, renders the pawnbroker liable to a penalty of 40s. In the same way, if a Jew opened a licensed pawn-office on Sunday, he would be liable to a penalty. It is not easy to perceive the policy of limiting the hours of pawnbrokers carrying on their business: the effect in Scotland is, as we see, to throw the business into the hands of irregular traders. Again, as to the alleged disadvantages. The wee pawns give no tickets, because the law inflicts a penalty on parties giving tickets who charge the rate of interest they charge. They are forced in like manner to pretend a sale, because if they received on pawn they would be liable to a penalty for charging the rate of interest they do charge. 2nd. The time for redeeming in the wee pawns is a month and not a year, because the loans being in very small sums, at a very high rate of interest, on articles taken very near their full value, the pawnbroker would lose if he held them for any time. The third disadvantage, that the wee pawns charge 43½ per cent. per annum affords one of the strongest arguments against the restriction which causes their existence, and, indeed, against usury laws in general. Thus the legislative attempt to prevent the poor being charged more than from 20 to 40 per cent. produces as a result, that the regular pawnbrokers do not lend small sums to them at all, and they have to borrow from wee pawns at 43½ per cent. whilst in Ireland, where pawnbrokers are allowed to charge from 40 to 80 per cent. on similar sums, *wee pawns* have no existence.

There is another restriction on the trade of pawnbroking, namely, the sum of 10l. to which the loans are limited. This forces the pawnbroker to adopt different methods of lending sums above that amount. These methods are attended with inconvenience and risk, which impose a proportionate burden on the borrower. The obvious remedy for the evils of wee pawns, dollyshops and the other evils connected with the trade of pawnbroking, is to leave that trade perfectly free. Let borrower and lender make their own bargains. Let the law not interfere except to enforce *bona fide* contracts, and to protect against fraud. The *Monti di Pietà* at Rome originated with Padre Giovanni Calvo, a Franciscan of the Order of Minorites, about 1541, for lending money not above thirty crowns, or about 6l. British. The rate of interest charged was only 2l. per cent.; the capital arising from charitable contributions or deposits for safety without interest. That an institution started on such a basis could not support itself if exposed to free competition is sufficiently manifest. But the undertaking, besides large donations, was enriched with indulgences and privileges, and had favours and endowments of a religious character conferred upon it, such as the privilege of appointing to certain benefices, or of enjoying them in a mode different from the customary tenure. These presented inducements sufficient to lead a religious order to undertake a work which other parties could not carry on as an ordinary business, and which would never defray its expenses. But the prejudice against usury and the canon and temporal laws against it at Rome, not noticed by Mr. Porter,

exempted this institution from competition as a place of deposit or of discount. The extent to which these prevailed is indicated by the long and warm contest between the Franciscans and Dominicans as to the merits of *Monti di Pietà*; the latter opposing them as illegal and usurious. At Leghorn, the *Monti di Pietà* is supported by a tax from every Tuscan vessel, and also from the deposits free of interest which all persons acting as sureties for public officers are obliged to lodge. At Paris the *Monts de Piété* like many other institutions in France, are under government control—the rate of interest charged is 9½ per cent. But it does not appear what the law is respecting other parties entering into the trade. Such being a sketch of the history in foreign countries, we come to their introduction into Ireland. The first of them in Ireland was established at Limerick by Mr. Barrington. The success of that institution was relied on by Mr. Porter in 1840 as the strongest argument in favour of their general adoption. Thus he says, "I can state with confidence that 'that institution is succeeding beyond the most sanguine expectations of its benevolent founder.' The principle on which the Limerick *Mont de Piété* was conducted, was to lend on much lower terms than the ordinary pawnbrokers. Thus the manager says, 'I have taken six weeks of the business of our establishment, and there were released a total of 1,095, giving an average of 182 pawns released each week. If they are released in any other office, the annual interest on them could be 59l. 3s., in our office it is only 19l. 17s. 2d., therefore we save that description of borrower 49l. 5s. 10d. a-year upon 3s. loans only. On the 12th of May 1838, he released 174l. 19s. 7d. money lent, and our interest was 7l. 15s. 2d., the pawnbroker's interest on that sum (including 1d. tickets) would have been 17l. 1s. 11d., so that the saving effected in one day to the poor was 9l. 6s. 9d.'" Such was the very promising outset of the Limerick *Mont de Piété*, but what was the result? The losses of the institution became so great that it was abandoned in a few years.

In 1841, the first year when the accounts were kept separate from the loan funds, there were eight *Monts de Piété* in Ireland. In seven of these institutions the operations led to a loss, and in only one was there a nett profit; but this would convey a very inadequate idea of the proportion of profit and loss,—for the loss on the seven institutions amounted to 5,348l. 3s. 4d.; whilst the profit on the one was only 8l. 8s. 5d. An explanation of this loss is attempted by showing that in one case there was an outlay of 110l. 9s. 8d. in law costs; in another 1,243l. 17s. for outfit and lease of premises; and in another 2,534l. 15s. 1d. for outlay on buildings;—but even deducting these sums, the loss will be upwards of 1,500l. The losses of these institutions produced the very natural result, that some of them were discontinued. Thus we find that before 1844, Limerick, Cork, and Dungannon *Monts de Piété*, those in which the loss had been greatest in 1841, had ceased their operations. I may observe that the annual return shows no profit from the *Mont de Piété* applicable to charity in either 1842 or 1843. In 1844, of the remaining five *Monts de Piété* we find no account from one; three are returned as having been profitable: viz., Tandragee, Portadown, and Lismore; whilst Newcastle sustained a loss of 6l. But in 1846 three out of the five *Monts de Piété* loan funds sustained a loss, so that two more gave up business, and the only institutions carried on in 1847 were those of Newcastle, Portadown, and Tandragee. Let us examine the profit and loss of these institutions for seven years. In Newcastle, the losses in four years were 99l., 51l., 61l. and 70l.; and the gains in three years 81l., 51l., and 21l.; leaving 180l. loss against 151l. gain. Such was the result of lending 2,000l. In Portadown, one of Mr. Porter's institutions lost in three years, 45l., 81l. and 5s. 11d.; and gained in two years 24l. and 6l.; giving a loss of 53l. 5s. 11d. against 30l. gain. The only *Mont de Piété* which appears on the returns to have gained more than it lost is the institution at Tandragee. But a note of the Commissioners to one of the returns shows that no confidence can be placed in the alleged profit of the institution. The managers of the Tandragee *Mont de Piété* profess their inability to furnish any separate account of its transactions, so that the

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table is necessarily incomplete. The items furnished are extracted from the account of the Tandra Loan Fund: and the most conclusive proof that the institution must really have sustained heavy losses like the rest is the fact that it began to wind up its affairs in 1847; for it lent only 644 in that year, whilst it had lent 3,882 in the previous year. These results afford the most conclusive condemnation of the system. For the trials were made under the most favourable circumstances by persons, as in Mr. Porter's case, whose scientific character depended on the result, and it has been a complete failure. It is, however, extremely profitable to inquire into the arguments by which many persons were induced to lend their support to these undertakings, because the same fallacies may produce injurious consequences in the case of other proposals to remove evils arising from mistaken legislative restrictions by the efforts of some charitable trading society. Mr. Porter's great argument consisted in a calculation of the probable gain of pawnbrokers. This he estimates as arising from two sources:—the penny charge for duplicates, and the profit after printing duplicates and deducting 6l. per cent. for capital and 6l. per cent. for stock. Thus, for the county of Armagh he estimates the first of these at 926l., the second at 2,646l. The Mont de Piété, he argued, can gain both these sums. It can make the first a present to the borrowers, and out of the second it can support all the local charities. Thus he shows that the whole grand jury presentments for charitable purposes were only 2,600l., whilst the profits from the pawnbroking was 2,300l. But in this calculation he entirely overlooked the expense of management. Thus, I have been informed by an intelligent pawnbroker that the lowest possible cost of taking in a pawn and recording it is 1d., quite independent of the remuneration of the proprietor, the rent of the extensive premises necessary for storage, &c. The result of Mr. Porter's experiments have been that the Monts de Piété all lost heavily, as we have seen. Even at Portadown and Tandragee the loss would have been far more extensive had not the institution been largely assisted from the profits of the loan funds connected with them. The next argument of Mr. Porter's is founded on a grave economic error. He proposed to lower the price of pawning, and at the same time to diminish the amount of the business. But it is one of the best ascertained laws in economic science that every fall in price increases instead of decreases the demand for a commodity. Another of Mr. Porter's arguments contradicts himself, and proves a proposition that he never perceived. Thus, he gives elaborate calculations to show the advantage borrowers had derived from the loans, and yet he had previously anticipated the diminution of pawning and loans as one of the beneficial results of the institution. How can it be good for the poor to diminish the number of the loans from which they gain so much? But Mr. Porter's facts as to the benefits which the poor derived from loans at from 13½ to 20 per cent., the rate he charged, shows the injurious effects of the law that prohibits them from paying more than 6l. per cent. to private money-lenders. Why should not they be allowed to benefit the poor by lending to them at 13½ to 20 per cent. as well as those who do so under the name of charity? And, indeed, the whole investigation of the facts with regard to pawnbroking, dolly shops, wee pawns, and Monts de Piété, teaches one important lesson,—the folly of legislating on different principles for the poor and rich. The real remedy for the evils which Mr. Porter vainly attempted to cure by charitable interference is to establish the same freedom in lending small sums that has for some years existed with regard to large sums. The defenders of the present state of the usury laws can be reduced to a complete dilemma. For how stands the case? The merchants applied to Parliament for a suspension of the Usury Laws on the ground that these laws instead of keeping down the rate of interest when any commercial crisis tended to raise it above the legal rate, really raised it much higher than it would have risen, compelling them to pay 20l. or 30l. per cent. where they need only have paid 3l. or 10l. per cent. Now, if this reasoning be correct, as all economists of the present day admit it to be, can anything be more cruel than to expose the poor to the evils from which rich merchants have been

relieved? But if the economists are mistaken and the reasoning of the merchants unfounded, why is the suspension of the Usury Laws not repealed? Why are pawnbrokers and charitable loan funds allowed to violate the spirit of the Usury Laws by charging far beyond the legal rate of interest on loans to the poor. In the commercial crisis of 1847, whilst the Prime Minister advised the Bank directors not to charge less than 8 per cent. on loans on approved security to the rich merchants of London, the law made it illegal for any one to lend small sums to poor farmers to help them through the same crisis at a higher rate than 6 per cent. How were they to get money at 6 per cent. when the market rate of interest in London was 8 per cent.? When merchants were allowed to borrow at 8 per cent. why should farmers and the poor be prohibited from borrowing at the same rate.

'On the Progress of Emigration from the United Kingdom during the last Thirty Years relatively to the Growth of the Population,' by Mr. Danson.—The first complete census of the three kingdoms in 1821 gave us the total population 21,193,000, in 1831 the number returned was 24,306,000, showing an increase of 3,113,000 in ten years. Whether the number added in each year of this period was greater or less than the number added in the year preceding could not be known from any comparison of these returns. But in 1841 the number returned was 26,916,000, showing an increase of only 2,610,000. It may, therefore, be presumed that the number added to the population in each year is now less than was added in the year before; but further, against this decreasing increment of the population we have of late years to place a rapid increase of emigration. During the 10 years 1821-31 the total number of emigrants was 738,582; and in the 7 years 1842-48 inclusive, the number was no less than 985,953. And according to the latest complete returns obtained by the Emigration Commissioners (down to the 20th of June last) the number of emigrants in the first half of 1849, was no less than 196,973. Hence it appeared that the emigration from the United Kingdom during the last three years was fully equal to, if it did not exceed, the natural increase of the population; and, in short, that emigration has now been carried on to such an extent as, if it were maintained, must effectually prevent the further growth of the population.

'On the County of Warwick Asylum for Juvenile Offenders,' by Mr. C. H. BRACEBRIDGE.—The paper stated that the asylum was established about thirty years ago upon a simple plan. A few acres of land were attached to the farm-house engaged for the asylum, but they were subsequently let off, as the soil was not adapted for cultivation by boys, and they were now simply instructed in shoemaking and tailoring. The boys had all committed offences for which they were tried at sessions or assizes, and the coming to the asylum was entirely voluntary on their part, nor was there any means of detaining them. The education given was of a very plain and simple kind, but had been rendered more valuable by the pastoral care of the clergyman of the parish, the Rev. Mr. Powell. The committee of management consists of county magistrates chosen at quarter sessions. The average proportion reformed had been during the last three years about 65 per cent., and the average cost had been 16l. 6s. 8d. per annum, although 46l. 17s. might be considered the price the benevolent have paid for each reform. [?] A comparison showed that the expense of punishing a criminal boy without reforming him cost the country more than it did to reform him, amounting as it did to 18l. 16s. 10d. per head, exclusive of expenses defrayed by Government in the prosecution and in the transportation to penal settlements.

SECTION G.—MECHANICAL SCIENCE.

'On the Cause and Prevention of the Oscillation of Locomotive Engines upon Railways,' by Mr. HEATON.—Mr. Heaton exhibited and described a machine illustrating the subject:—and in a discussion which followed the reading of his paper—and in which the President and Mr. Roberts took part—an opinion was generally expressed that with some modifications Mr. Heaton's plan was likely to answer the object which he had in view.

'On a Patent Water-Meter,' by Mr. W. PARKINSON.

—He described the advantages of his system and arrangement to be—1. An uninterrupted and instantaneous supply.—2. Equity between buyer and seller.—3. All annoyance from frost and occasional short supply is avoided, as the pipes may be laid internally.—4. In new buildings the meter will be found cheaper than the old cistern.—5. Durability of the meter, which may be fairly reckoned to last twenty-five and thirty years when properly fixed in an elevated situation free from damp, dust and injury.

'On a Machine for Forming Moulding out of Sheet Metal,' by Mr. ROBERTS.—The purport of this paper could not be explained without the aid of diagrams.

'On a Desiccating Process,' by Mr. DAVISON.—Mr. Davison stated that all other methods of drying consist in generating heat by simple radiation, or throwing off heat from a heated surface, whether the surface be brick flues, cockles, steam, or hot-water pipes. Heat, he said, is easily attainable in this way, and to almost any grade of temperature; but heat is not the only essential for drying, or why does the bleacher or laundress hang out their articles to dry on a cold March morning? It is true that heat facilitates the evaporation of the watery particles; but a current is likewise necessary, otherwise all the water which is thus converted into vapour will only tend to charge the chamber with steam, and it is not until this steam has arrived at a certain excess or pressure that it will make its escape, and the operation of drying really commences. The amount of current obtainable in this way is proportioned to the rarefaction and quantity of air admitted and allowed to come in contact with the heated medium. If little is admitted, there is little current, an increased temperature, and likewise an increased volume of vapour; or *vice versa*, if a larger amount of atmospheric air is admitted, there will be a corresponding increased current, a lessened temperature, and much less vapour. The ordinary current obtainable in this way may be taken at three or four feet per second. To subject any article to a slow current of heat in a comparatively close chamber, or where there is an exceedingly small aperture for the escape of vapour whereby that article (whatever it may be) is enveloped in an atmosphere of its own steam is (to give it its proper name) not drying but *steaming*. If there is next to no escape at all, as in the case of an oven, it is in reality *baking*. Mr. Davison stated that it is not only a moving but a rapid current which is the great desideratum for all drying purposes:—and that it is the impulsion of atmospheric air, at the velocity of the hurricane or upwards of 100 miles per hour (or any other speed) combined with the element of heat under perfect control which, in a few sentences, constitutes his desiccating process. Mr. Davison proceeded to describe the means by which the two operations of current and heat are created and kept up—and some applications which have been made of the process, together with the practical results.

The President expressed his opinion of the high state of perfection to which Mr. Davison had brought his plan, and intimated that if he could go on economizing it he believed its use would become universal.

MONDAY.

'On the Manufacture of the Finer Irons and Steel, as applied to Gun Barrels, Swords, and Railway Axles,' by W. GREENER.—The first innovation on the old principle of manufacturing gun barrels entirely from old horse-nail stubs was due to the late Mr. Adams, of Wednesbury, who brought out what is termed Damascus iron, which is constructed of alternate layers of steel and iron faggotted, drawn down into rods, then tortuously twisted, and then welded into barrels forms the Damascus barrel. The success of this experiment, both in point of beauty and strength, was so great as to be underestimated at 50 per cent. as compared with the strength of stub twist iron. The next experiment was to blend more intimately than the above steel with the horse-nail stubs in the proportion of one to two of the latter. The paper described the mode of this; and then went on to narrate that the next and most important improvement in metals was the manufacture of gun barrels from scrap steel entirely, and for this purpose old coach wheels were generally in request: by clipping these into pieces, perfectly

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consisting them and welding in an air furnace, a metal is produced which surpasses in tenacity, density and density any fibrous metal ever before produced. The tenacity of it when subjected to tension in a chain testing machine is as 8 to 2½ over that of the old stub twist mixture. The perfect safety of barrels produced from it is astonishing; no gunpowder ever tried has power to burst them when properly manufactured. These experiments had induced others on a more extensive scale; to effect this, ingots of cast steel were taken from the mill made to No. 3 in the scale of carbonization. These after rolling into flat bars, were clipped into small pieces, immediately mixed and welded as before in the air furnace, drawn down into rolls, and re-forged; these were subsequently drawn down, and were then ready for being made into gun barrels, either with or without spirally twisting them; to form Damascus barrels from this was perfectly safe—this was ascertained by experiments. It was discovered that the density and tenacity of the metal was sufficiently great to effectually resist the enormous force of this great cast of gunpowder. The manufacture of swords was another article to which this improvement applied. All the investigations of the writer had tended to satisfy him that the Arabs thus produced their finely-tempered Damascus swords; namely, using two steels of different carbonization—mixing them in the most intimate manner, and twisting them many fantastic ways, but observing method in that fancy; and it was a fact that no European sword has ever yet been produced equal to the Damascus. The Government inspector of small arms was of opinion that the swords made in Damascus were not fit to be used in the army. The writer's investigations had satisfied him that tempering by crystallizing the steel—that is to say, tempering in the ordinary way—was far from the wisest. The Damascus blade in its fibrous state or hammer hardened is more difficult to break by 100 per cent. than the best English-made blade. This had been tried; but temper it in the same way, and it showed greater tenacity than our own; the Damascus here was destroyed by the carbon becoming equally diffused; nor would acid develop it—it was entirely gone. From these and other facts the conclusion might be drawn that swords constructed of dissimilar steel—tempered by condensation of its fibres—either by repeated rollings, hammering, or many other processes, which our perfect machinery gave us the facility to do—are the best. Therefore in time we might hope to see every soldier of the empire armed with a weapon as good if not so costly as the highly prized Damascus. The remaining part of the paper referred to a subject already much discussed—the manufacture of railway axles.

"On the Present State of Electro-Telegraphic Communication in England, Prussia, and America," by Mr. WHISHAW. — Mr. Whishaw stated that the object of his present communication was not to bring before the Section the numerous telegraphic instruments now in use and recently made public, but to point out the advantages and disadvantages of the three great systems of electric telegraphs now in operation in England, Prussia and America. In England the wires, being suspended from post to post along the sides of railways, are exposed to the following disadvantages—running of trains off the rails, by which posts and wires are all carried away together, and thus the communication is stopped. Secondly, from atmospheric influences, whereby irregular and uncertain deflections of the needles in Cooke and Wheatstone's telegraphic instruments take place, besides occasional declination to parts of the instruments, &c. Thirdly, from snow-storms, in the case of the South-Eastern telegraph which occurred during the last winter, when the wires and posts were all removed, and considerable interruption was caused in the transmission of communication. Fourthly, from damage by malicious persons, who sometimes twist the wires together; and for whose apprehension rewards have frequently been offered by the English companies. Fifthly, the wires have sometimes been connected together by a fine wire which is soldered to the line wires, and thus the communication have been diverted from their right channel. Sixthly, the expense, viz. 150*l.* a mile, for the above-ground system, with an annual expenditure for repairs. Seventhly,—and consequently,

heavy charges for the transmission of messages. Eightiethly, the time required in learning perfectly the manipulations of the needle telegraph, so that if a telegraphist is from any cause disabled, there is no one at hand to take his place. With regard to the charges, the following facts will suffice to show the advantages of economical telegraphs. In America, the charge for twenty words transmitted by the telegraph to the distance of 500 miles is but 4s.; whereas by the English company's charges the same communication would only be transmitted 60 miles, or less than one-eighth the distance,—and by the South-Eastern Company's charges not 20 miles, or one-twenty-fifth of the 500 miles. Again, a communication of ninety words in America may be transmitted from Washington to New Orleans, 1716 miles, for 41s. 8d.; whereas by the Electric Telegraph Company's charges it would only be transmitted a little more than 200 miles,—and by the South-Eastern Company's scale under 100 miles. The extent of telegraphs in Great Britain at present is about 2,000 miles; and there yet remain railways to an equivalent without telegraphs. Mr. Whishaw expressed a hope that within a short time every principal town in the kingdom would be connected by telegraph, as the underground system may be effected without the aid of railways, viz. under turn-pike roads and towing paths, &c. This plan has been practically carried out in Prussia, where at the present time there are 319 German miles = 1492·92 English miles in actual operation. A single wire coated with gutta percha is laid under the railway at a depth of two feet, and connected with the instruments and batteries at the different stations. A colloquial and also a printing telegraph are used in each principal station—both worked as required by the single wire. The experiment as to burying the gutta percha wire in the ground was commenced some years ago, and being found to answer perfectly, the Prussian Telegraph Commissioner appointed in 1844 determined on adopting the underground plan entirely for the government telegraphs, and which were commenced in July 1845, so that no time has been lost in carrying them out. At Oderbay, the Prussian system is in connexion with the telegraphic line now in course of construction between that place and Trieste via Vienna; and as regards the Prussian Government Telegraphs, the public has the advantage of them by payment of certain fixed rates. The cost of the Prussian system is under 40*l.* a mile. The American system is remarkable for the great extent to which it is already carried, viz. 10,511 miles, costing less than 20*l.* a mile. It consists of a single iron wire supported from post to post, but is carried far beyond the limits of railways, and is consequently frequently damaged, so that a code of rules is established for the repair of the wires, which is undertaken by gentlemen living along the lines, and who are furnished with a set of tools for the purpose—their reward being the free use of the telegraphs for their own private communications. The economy of first cost, however, causes a very low tariff for the transmission of communications, so that the poorest person is enabled for a few cents to send a communication to a considerable distance. From the actual operations of the three systems, it appears that the Prussian is the most simple, effective and economical—for annual repairs are not required to the line wires, as in the cases of England and America, where they are exposed to so many casualties.

Mr. FLANAGHAN, of Kentucky, made some observations respecting the mode of repairing and keeping in repair the telegraphs in America.

'On a Machine for Ventilating Coal-mines,' by Mr. BRUNTON.—The paper referred to a kind of exhausting ventilator, invented by Mr. Brunton.

—The inventor of the machines exhibited is a Mr.

Slonimski, of Białystok, in Poland. The first instrument submitted to the notice of the Section was one for performing the arithmetical processes of addition and of subtraction. It consists of a thin box of wood or metal, covered by a plate of metal, in which are perforated a convenient number of circular apertures and openings, around which are engraved or marked the several figures or digits 0 to 9, and behind which are indented plates or wheels, having in each a suitable number of teeth, some of which

are shaded, or black, the others being left clear, or white. A small pointer, or style, is furnished with the instrument, for the purpose of turning round the indented plates or wheels, by inserting the instrument between two contiguous teeth, and moving it in the required direction. The style is required to be inserted between those two teeth which appear under the particular figure engraved on the plate, which corresponds with the number required to be added or subtracted. One general rule being to be attended to, viz., that if the style be placed between two clear or white teeth, it must be turned to the extreme right hand of the circular opening; but if between two dark teeth, it must be turned to the extreme left hand end thereof. The upper part of the instrument is to be used for addition, and the lower part for subtraction, as engraved thereon. The multiplication instrument consists of a rectangular box, about 15 in. square and 3 in. deep. It contains cylinders having printed tables of figures on the circumference of each, which cylinders revolve separately, by means of the knobs at the bottom of the box; and by other knobs, the upper part of each cylinder is moveable in a vertical direction also.—the rotative and the vertical motions being regulated by figures termed indices, that appear through small holes over the axes of the cylinders. In addition to the index holes, there are nine other rows of holes, on the surface-plate of the instrument,—the lower row of holes being for the multiplicand, and the corresponding rows of holes above it to exhibit the products of that multiplicand by each of the nine digits; and these products are produced almost immediately, and without requiring any mental effort. The horizontal number of holes in this instrument is eight; and it is therefore calculated to give the product of any number having seven places of figures, or to millions, whatever may be the order of those figures.—This instrument is the result of a new theorem of figures discovered by Mr. Slonimski.

After Mr. Knight had submitted his models, several gentlemen expressed an opinion that an instrument of a similar character had already been noticed in the columns of the *Athenæum*.—Mr. KNIGHT, however, declared that the one alluded to was of a very different character.

'On a new Rotary Engine,' by Prof. M'GAULEY.—This paper could not be properly explained without the diagrams.

TO CORRESPONDENTS.—J. T. J.—Bachelor—Two Readers—J. F. G.—C. H. N.—Signa—A Late Governess—received.
ZEA.—We cannot print this communication without knowing who our correspondent is.

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